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## THE PAST YEAR.

NOTWITHSTANDING the disastrous war in Europe and elsewhere and the destruction of peaceable merchant ships with the consequent dislocation of trade by raiding cruisers of Germany, a retrospect of the past year gives cause for congratulation on the results of agricultural and pastoral operations throughout the State. Ever since the memorable drought which—after operating disastrously on all rural industries for several consecutive seasons—terminated in 1903, Queensland has enjoyed, if not absolute immunity from droughts, at least a practical continuance of good seasons. At times when crops were on the verge of perishing for want of rain, and when sheep and cattle were on the eve of being removed to relief country, bountiful rains occurred just in time to avert any severe losses. Such has been the case during the latter half of the past year, when the early wheat and maize crops especially suffered in the early stages of growth owing to a dry spring and the lateness of the summer rains; but good rain fell in many districts in time to save the great bulk of the crops; whilst at the latter end of November bountiful rains were experienced over almost the whole of the State.

To show how wonderfully the Queensland soil responds to a good season, consider the last years before the termination of the great drought some twelve or thirteen years ago in 1903.

In 1902 the State exported 552,625 lb. of butter, valued at £24,610; in the following year these figures were exactly doubled; and in 1904 the increase of the butter export was phenomenal, as it amounted to 9,520,921 lb., of a value of £344,943. From that time forward the production and export of butter regularly increased until the dairying

industry has reached a position when the value of it can be referred to in millions, the value for the year 1913-1914 being estimated at £2,500,000. Yet the year did not open favourably for the production of dairy products, as almost every district suffered from a comparatively dry spring and the summer rains were later than usual.

As regards the progress of agriculture proper, there are to-day nearly 1,000,000 acres under actual cultivation, which is an increase of 48 per cent. on the area cultivated in 1903. Owing mainly to the expansion of the dairying industry, there was a smaller area under wheat during the past year than in 1904, when 150,958 acres produced 2,149,663 bushels of grain. For the 1913-1914 crop 132,665 acres were sown, which yielded 1,769,432 bushels.

The sugar industry, although labouring under some disabilities, which it is not our province to discuss in this Journal, has largely progressed during the year. We do not yet know the results of the crushing for 1914, but, owing in some cases to frosts and in others to the dry spring, the total yield will probably fall some 40,000 tons short of the State's requirements. The record sugar year was 1913, when 147,743 acres were under cane. Of this area, 102,803 acres were cut for crushing, returning 242,837 tons of 94 per cent. net titre sugar.

During the past year much more land has been placed under cane, especially in the North, where a large new mill has been erected at Inkerman, on the Lower Burdekin, and is already at work. A central mill is being erected at Babinda, which will be ready for the 1915 crop; and a third will be established at Durradgee, near Innisfail, which will probably be at work in 1916.

The present 47 sugar mills, 2 refineries, and 1 juice mill afford employment to nearly 5,000 hands; whilst the industry generally gives employment directly to some 50,000 employees of various grades, and indirectly, earning their living by sugar handling, the number may be reckoned by many thousands, including waterside workers, men engaged in transport of cane and sugar, seamen, and a host of others whose livelihood depends wholly or in part on the sugar industry after the raw sugar has left the mills. The number of plantations, excluding areas under 5 acres, is 3,982—an average to each planter of 37 acres, and an increase in number of 81 plantations above those of the previous year.

Taking the returns from all our industries as set forth in the Annual Report of the Department of Agriculture and Stock for the year 1913-1914, we see great cause for congratulation, and a great incentive to a stimulation of immigration from Great Britain, Canada, the United States, and possibly from countries now allied with the United Kingdom.

# Agriculture.

## EXTENSION OF AREA UNDER WHEAT FOR SEASON 1915—GOVERNMENT ASSISTANCE TO WHEAT-GROWERS.

In November last a letter was received by the Department of Agriculture and Stock, in which it was asked whether the Department intends to take any responsibility or risk with the result of the ploughing and sowing, and also if the Department has any views on the preparation of land for wheat. Deep ploughing, it was stated, has been a failure this year (1914) on the Downs, and the best crops have been grown on the drier areas, where the land was simply cultivated with a spring-tooth or disc cultivator.

In reply, it was assumed that the writer desired to know whether this Department will guarantee any price for wheat raised, and he was informed that the assistance offered by the Minister does not extend beyond the ploughing and preparation of the land and sowing of the crop.

With regard to the question raised as to deep *v.* shallow ploughing, and advice as to subsequent treatment of the land to ensure a crop, this is being dealt with direct by the different Agricultural Instructors, who have been engaged for some time past in tendering what assistance it is possible to give to wheat-growers.

One provision in connection with advances has relation to the ploughing up of the land by the 28th February next, this being done for the purpose of putting it into condition to trap the summer rains and admit of their percolation into the subsoil. Deep ploughing at this stage is not advocated for obvious reasons, and the advice tendered by the Department is strictly in the direction of the conservation of soil moisture by judicious cultivation on recognised dry-farming principles.

We wish to draw attention to the following conditions under which financial assistance will be given to farmers who may require it, and who are invited by the Minister for Agriculture to make application for it:—

"Each application will be subject to inquiry, and will be decided by the Minister upon the merits of the case.

"Financial assistance will be given for the following purposes:—

1. For increasing the area under wheat over and above the area planted by owner or occupier during 1914. Assistance in this respect will only be given where the land has been or can be ploughed by the 28th February, 1915.

2. For planting new land where wheat has not before been grown.
3. For the supply of seed for planting.
4. For the hire of horses or machinery.
5. For the payment of extra labour required.

"All farmers who desire assistance should be particular in furnishing the information concerning the assistance required, so that there may be no delay in making the necessary inquiries.

"Applications are to be addressed to the Under Secretary, Department of Agriculture and Stock, Brisbane, not later than the 10th December, 1914."

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## PICKLING WHEAT.

There are three methods of pickling wheat to destroy or prevent the germination of the spores of smut. The most commonly used pickles are:—(1) A solution of formalin; (2) Sulphate of copper (bluestone); (3) Plain hot water. The solutions are:—Bluestone at the rate of 1 lb. in 5 gallons of water, or formalin at the rate of 1 lb. in 40 gallons of water.

The seed, in either case, may be spread on a wooden floor and the solution sprinkled over it, turning the grain over and over either by shovelling or raking, so that all the grains become thoroughly wetted. The seed is then spread out to dry, and, if left in a thin layer over night, it is ready for sowing in the morning. Instead of sprinkling, which is wasteful, dipping may be resorted to. A bushel or so is placed in a bag and dipped in the solution, taking care that all the grains are thoroughly wetted by shaking the bag and plunging it in and out. In the case of bluestone only a minute or two is necessary for the dipping process, on account of its corrosive action; but in the case of formalin five minutes may be allowed, and it is less injurious to the grain, the cost being about the same as for the bluestone process. Both processes are equally effective in destroying the smut germs. The bluestone solution may be used again and again, but formalin is volatile, and it follows, therefore, that only the amount of formalin should be prepared that is required for immediate use, and sprinkling in this case should be preferred to dipping. Formalin is poisonous, and must be kept where there is no chance of children or others obtaining it in ignorance of its nature: 1 gallon of formalin solution is sufficient for 4 bushels of seed. For the hot-water treatment, two boilers are needed, containing water at 120 degrees Fahr. and 135 degrees Fahr. respectively. A smaller vessel containing boiling water and an abundant supply of cold water should be at hand. The seed to be treated may be placed in a gunny bag or in a perforated kerosene tin. Plunge the vessel containing the grain into the first boiler (120 degrees Fahr.), and move it about for a minute or two till the grain has all been warmed. Take care to keep up the temperature. Then plunge it into the second boiler (135 degrees Fahr.). Leave it there for ten minutes, moving it about and agitating the grain. Then take it out and plunge it into cold water, and then spread it out to dry, after which it is ready for sowing.

## LIME WATER.

Mr. H. Ross, in an article on "The Treatment of Seed Wheat for the Prevention of Bunt or Stinking Smut," in the "Agricultural Gazette of New South Wales" (2nd March, 1914), advises:—

"The action of the bluestone during the process of pickling is that it kills the tiny spores or seed of the bunt which adhere to the outside of the grain. Now, while bluestone has the power to kill these spores it has also the power to impair the vitality of the grain, and even to kill the germ. To guard against this, the following measures should be observed. If there is no prospect of immediate germination—that is, if a 'dry' sowing is made, the bluestoned wheat should, after having been allowed to drain for from 10 to 15 minutes, be dipped into a solution of lime water, which is made by stirring ½ lb. of freshly burnt lime into 10 gallons of water. This mixture is allowed to settle; then the clear lime water is decanted, and into this the bluestone-treated seed is dipped for from 2 to 3 minutes. The lime neutralises the effects of the bluestone, and so preserves the full vitality of the wheat germ. If, on the other hand, a 'wet' sowing is made and an immediate germination of the seed is likely to follow, then there is little need to dip the bluestoned wheat into lime water.

When using lime water care should be taken to make a fresh mixture now and again, as the constant dipping of the bluestone-saturated butts of wheat into the lime water will change this eventually from an alkaline into an acid solution, in which case it would be useless; and for that very reason bluestone and lime should never be mixed together in a solution used for pickling wheat.

The chief advantages gained from using lime water, in addition to bluestone, are:—Firstly, that a farmer following this practice is in a position to pickle all his seed wheat, say, in March, ready for sowing in April and May, without running any risk of the germination being affected; secondly, that a better germination will be obtained if the sown seed should lie in the ground for some time before rain falls and germination takes place.

Little extra trouble is involved in the bluestone-lime treatment, and farmers are strongly advised to adopt this method in preference to the bluestone treatment only."

Should it be found impossible to obtain freshly burnt lime, it is recommended that ½ lb. of slacked lime be mixed with 10 gallons of water, thus making milk of lime, into which the butts of the bluestoned wheat should be dipped for a period of from 2 to 3 minutes.

Milk of lime differs from lime water in so far that in the former the particles of lime are not dissolved but held in suspension, whereas in the case of clear lime water the particles are dissolved.

[The above was published in the March (1914) issue of the Journal; but as many new subscribers are writing for information on the subject, in view of the wheat-sowing season of 1915, we republish it for the general benefit of intending wheat-growers.—Ed. "Q.A.J."]

## A MARKET FOR SUNFLOWER SEED.

There is nothing more easy to grow as a farm crop than sunflowers, but, apart from their ornamental character, one never thinks of these plants as being of any use to the cultivator. Although the plant has never been cultivated on a commercial scale in Queensland—except, as far as we know, by Mrs. H. E. Waller on the Binjour Plateau, Gayndah, about five years ago—there is no reason, except, perhaps, prejudice, why it should not be a staple crop for Queensland. Why it has been so long neglected by Australian farmers it is difficult to say, considering that it is grown to an enormous extent in Germany, Hungary, and Russia, and the demand is always greater than the supply, notwithstanding the fact that each seed sown produces 1,000 or more, and the price ranges from £10 to £11 per ton. The most profitable sort to grow is the Giant Russian, of which each head contains from 1,000 to 2,000 seed, and even as many as 3,000 seeds per head have been harvested in Russia. The plant is admirably adapted to the soil and climate of Queensland. It thrives as well in the dry West as on the Darling Downs and on the Eastern coast lands. It is not particular as to soil, but succeeds best on deep well-drained loam, whether scrub or forest or plain. It does well on maize lands; and as the plant needs a lesser rainfall than maize, and is a much quicker grower, the crop requires less cleaning owing to its giving more shade, thereby lessening the growth of weeds, which means considerably less work to the farmer. From 4 lb. to 5 lb. of seed is sufficient to sow an acre at distances between the rows of about 3 ft. and in the rows about 12 in. to 18 in. from plant to plant. The return may be set down at about 50 bushels per acre. Sunflowers grow very rapidly, the crop being usually ready to harvest in three months.

The harvesting is a very simple matter. Mrs. Waller says that on ploughed ground a tip dray can be used provided with a frame covered with bag. The dray passes along the middle of the rows—one row on each side. The heads are cut and thrown into the dray. They are then driven to a convenient place in a paddock where there is a box, about 4 ft. high by 3 ft. square, with a wooden batten nailed on about 9 in. from the top inside on which the heads are "banged," when all the seed which is fully ripe and good falls into the box. The seed is then winnowed. Two men cutting into the dray can keep one man threshing.

Mr. Henry A. Tardent, in a paper on "The Sunflower," published in this Journal in October, 1899, said that "a very expeditious way to harvest it is to cut the stem close to the ground by means of a horse corn-cutter, and to cart home stems and heads together. The heads should be then dried as quickly as possible, and as soon as dry enough they can be threshed, winnowed, and bagged."

The seed is rich in oil, and yields 34 to 50 per cent.; whilst the oil cake forms an excellent food for stock. The best time to sow the seed is from September to February, inclusive.

As to a market for the seed, we are informed by Mrs. Waller that a payable market can be found for seed grown under contract for the firm of Messrs. Paten and Co., 60 Queen street, Melbourne, to whom she

consigned all her crop. This firm, writing to her, said: "If you know of anyone who has the necessary soil and climatic conditions for growing Black Sunflower seed, see if they will quote a price per ton for 10 to 50 tons f.o.b. Brisbane."

Under the present war conditions, when the seed probably cannot be obtained from Russia or Hungary or Germany, this might be a good opportunity to establish a new industry in Queensland.

## CORN COBS AS FODDER.

The subject of ground corn cobs as a food for stock has given rise to much controversy, especially amongst the farming community in the United States of America, some farmers asserting that once the grain is removed the cobs are of no value, whilst others as positively assert that they possess high nutritive properties. As there are many tons of cobs annually thrown away or used instead of firewood in this State, it becomes a matter of very great importance to farmers to know whether they are thus destroying a valuable fodder material, or whether the cobs are, as supposed, absolutely useless as feed for stock. To decide this question, the Department of Agriculture, so far back as 1899, requested Mr. J. C. Brünnich, Agricultural Chemist to the Department, to furnish an analysis of the corn cob, and show its value and properties as a fodder. Mr. Brünnich, having made the analysis, furnished the following information, from which it will be seen that, taking the comparative food values, commencing with corn as 100, of certain food materials, lucerne hay come second and corn cobs third on the list, corn stalks fourth, and potatoes fifth, &c. In his report Mr. Brünnich remarks that corn cobs, as well as corn stalks, have a considerable value as food, as shown by the following analysis:—

| — | | Albuminoids per Cent. | Digest. Nutrients Carbo-Hydrates per Cent. | Fat per Cent. | Comparative Value. |
|---|---|---|---|---|---|
| Corn cobs ... ... | from | ·6 | 41·7 | ·2 | 37 |
| | to | 1·1 | 43·2 | ·4 | 49 |
| Corn stalks ... ... ... ... | | 1·1 | 37·0 | ·3 | 36 |
| Corn ... ... ... ... ... | | 8·4 | 60·6 | 4·8 | 100 |
| Potatoes ... ... ... ... | | 2·0 | 21·8 | ·2 | 26 |
| Lucerne hay ... ... ... ... | | 9·4 | 28·3 | 1·0 | 65 |

Professor E. W. Stewart, in his "Feeding Animals," recommends strongly to pass the whole corn crop—stalks, ears, and all—through a large cutter and reduce it to a fine chaff.

Corn cobs may be ground by themselves to a fine bran-like mass; but the process is slow, and it is questionable if it would pay here.

That corn cobs, which in Queensland are universally a waste product, have a very considerable value as stock food has been demonstrated in the long-continued general experience of American farmers. The following table of analyses will serve to show how in chemical constituents the corn cob compares with corn and two common fodders:—

| — | Water. | Ash. | Albuminoid. | Fibre. | Nitrogen (Free Extract). | Fat. |
|---|---|---|---|---|---|---|
| Corn ... ... ... ... | 13·93 | 1·25 | 8·82 | 1·59 | 70·48 | 3·92 |
| Corn cob ... ... ... | 9·25 | 1·16 | 1·91 | 31·22 | 55·86 | 0·60 |
| Oat straw ... ... ... | 12·50 | 1·81 | 2·30 | 55·96 | 26·42 | 1·00 |
| English hay ... ... ... | 14·30 | 4·70 | 7·00 | 26·90 | 45·40 | 1·70 |

These figures do not show the whole value of the cobs as a feed. Cobs are never fed alone, but generally with the corn which grew on them. When fed thus, the cob seems to be admirably suited to act as a balance to the more concentrated grain. Moreover, three-fifths of the ash of the cob is potash—an element of undoubted value as an aid to digestion. As a result of experiments, made with 10 pigs and 20 bullocks, to test the question of the food value of cobs, it was found that 1 lb. of corn cob, when ground and fed with the corn which grew upon it, was worth more than 1 lb. of meal made from corn alone. In other words, both the pigs and bullocks gave better returns from corn and cob meal than was obtained from feeding clear corn meal. Considering the large proportion of ear corn that is cob (18 per cent.), this fact of the feeding value of cobs is a matter of no little importance where, as in Queensland, corn and hay in all its forms have a very high market value. This, however, should be borne in mind: That the cob must be ground fine—quite likely the finer the better; and to grind a given amount of whole ears of corn will require three times as much power, or its equivalent in time, as is needed in reducing the same amount of shelled corn.

## THE FOOD SUPPLY QUESTION.

In war time, and especially during preparation for war, the intending belligerent countries pay particular attention to securing as large a supply of provisions as possible. As a writer in the "Pastoral Review" puts it:—"Without the agriculturist there could be no war—at least, no war of any duration. The life of an army depends mainly upon its supplies; and if those supplies can be brought forward with regularity and in sufficient quantities, the army so served possesses a very great advantage over opposing forces inadequately and irregularly supplied. The staple foods of armed forces (men and horses) are the products of the land—wheat, maize, fodder, and meat; and one of the first precautions taken by a nation at war is to ensure as large a supply as possible of these commodities."

Writing in the London "Daily Mail," the Paris correspondent of that paper gives interesting facts and figures with reference to Germany's food problem:—

"Already there come from Berlin stories of a hungry population seeking food in shops that have been emptied by the panic of well-to-do people. Already the shadow of famine is said to be darkening the summer sky in every German city. These tales must be received with doubt. Unless they had large stocks of food, the Germans would not have challenged Europe so boldly. Whenever it becomes necessary, the Government of the Kaiser, by virtue of martial law, will seize all food supplies and distribute them equally.

"Nevertheless, the situation of Germany is such that it will be hard for her to carry on a war for two months without starving her town populations, and impossible for her to fight on into the winter unless she can keep the sea open for her merchant ships.

"From being a country in which the people were mainly tillers of the soil, Germany has become a country of great cities and dwindling farmer population. Nearly half of Germany's 68,000,000 live in towns. Out of her own resources Germany can only provide 86 per cent. of her people's nourishment.

"She buys the bulk of her wheat from Russia; that market is closed. She is a good customer for Roumanian wheat; but even if Roumania remains neutral, and is willing to sell, how are cargoes to be shipped? All ships bound for German ports are fair game to the navies of Britain and France.

"To send wheat overland would raise the price, and there is danger of railway lines being cut. Germany's chances of getting supplies from her usual sources are poor. Equally small is the likelihood of drawing upon the United States.

"The only German frontiers that remain open are those parting her from Italy and Austria-Hungary. Hungary may send some cattle, and will continue, so long as Munich can pay for it, to supply barley for making beer. But neither she nor Austria has any great quantity of wheat to spare. Through Italy, Germany might receive a certain amount of food for her sharp-set millions, but it can be only a limited amount. Italy has not much to sell, and grain ships making for Italian ports will be suspects. Few owners will care to take the risk.

"In any case, even if Germany could find purveyors ready to supply her needs, the whole matter is governed by this question: Can she pay? Her war chest is known to be full at this moment, but her expenses are enormous. It is reckoned that the cost of the war can scarcely be less than £12,000,000 a day spread over Europe. Germany's share of this, I am told by competent authorities, is between £3,000,000 and £4,000,000; she is exporting nothing; she is unable to borrow. Suppose, for the sake of argument, that she could find merchants ready to sell to her, they would not sell except for gold paid immediately. How long will she have gold enough to pay?

"Her annual imports of food and drink cost £162,000,000. That is a surprising figure, when we recollect that ours cost us not so very much more. We are accustomed to think of ourselves as a nation entirely depending upon outside supplies, and of Germany as almost self-supporting. Among her imports, luxuries account for a good many millions; but the same is true of us. Allowing for foods and drinks which are in no way necessaries, the fact remains that Germany depends upon foreign markets for a large part of her people's daily bread.

"She needs at least £12,000,000 worth of food supplies a month. Admit that she can pay for them, the query still comes: Where can she buy them, and how bring them to hungry mouths?

"It must be plain to everybody that Germany could not agree to any proposal that the strength of fleets should be fixed to remain at their present ratio. She saw the impossibility of making war safely unless her navy were powerful enough to keep the seas open to her commerce.

"What decided her, then, to make war unsafely? The belief, it would seem, that she could by a series of knock-out blows sweep everyone out of her way. The alternative to that is famine."

How does the case stand with Great Britain and the Allies? It is said that the German women are competent farmers and can carry on the usual agricultural occupations without the male workers; but, for all that, if there are no men to grow the crops, drive machinery, and perform the necessary heavy labour connected with the production of agricultural and pastoral supplies, and if there are no means of importation, a country cannot hold out for any lengthened time. Here it is that the United Kingdom and her Allies possess such a tremendous advantage over Germany. To again quote the "Pastoral Review":—

"Every care is taken that all available stock in the Empire shall be at her [Great Britain's] service. Export of grain and meat, in our own case, to other countries is prohibited; and the Government possesses the power to supply her own needs as occasion arises. Thus, a country without the men to grow the crops, &c., and without the means of importation, would not be able to hold out for very long; and this is where Great Britain and her Allies possess such a tremendous advantage over Germany. Great Britain's numerous colonies can grow and export food for the armies without the slightest hindrance as long as the German fleet is kept off the seas; but, on the other hand, Germany is so situated that she can import very little. She can certainly—as long as the Allies are kept out of her country—grow crops, although, apparently, every available man has been called to the colours, because the German women are competent farmers, and quite capable of doing that part of the men's work."

But the British oversea dominions have it in their power to enormously increase the area under cereals and other food crops. In this State of Queensland, under present labour conditions, it is reasonable to argue that farmers may not be in a position to very largely extend the areas devoted to the raising of food crops; but the Government, being fully aware of the difficulties, has swept them away by coming to their assistance by making advances to enable them to put additional areas under crop, by arranging for supplies of seed wheat, and generally doing all in its power to aid them in the task of production of such crops as may be exported for the use of the armies in the field, and for general distribution amongst our kindred in the old country. It is satisfactory to know that this offer of the Government is meeting with considerable response, even to the extent of sowings of 600 acres by individual farmers.

## WHITE MAIZE.

The question of the relative merits of white and yellow corn has been discussed in the American Agricultural Press and at innumerable farmers' meetings in that country at frequent intervals. From the chemical standpoint, the colour seems to have no special significance. Upon the question of relative productiveness, opinions have been rather evenly divided, and, although of the tests made at seven agricultural experiment stations, six report greater yields with white than yellow varieties, it does not, therefore, follow that all white varieties will yield more than all yellow ones. Numerous yellow varieties are fully as productive as many white ones. If the best varieties of white and yellow were compared, the relative difference would probably be slight. Yet all tests go to show that it is usually possible to secure greater yields from white than from yellow varieties.

As far back as the sixties, white maize was grown to some extent on the Brisbane River, Oxley Creek, and other farming districts in the neighbourhood of Brisbane; but this was mainly with a view to grinding it into maize meal, which was often mixed with flour for bread-making. The maize was ground at Messrs. Pettigrew's mill, at Brisbane. But this variety was not favoured by buyers owing to its susceptibility to the attacks of weevil, which did not admit of its storage for any length of time—in fact, the corn was frequently attacked by the weevil even before husking in the barn.

Another point as regards white maize is that it is very liable to cross-fertilisation by yellow varieties, and hence requires to be grown at some distance from yellow varieties; and where, as in the case of small farms, such segregation is impossible, a pure white maize is unlikely to be produced.

The Department of Agriculture instituted last year an inquiry into the White Maize question; and it was found that, in 1913, 472 bushels were ground in metropolitan mills into meal, yielding 47 tons valued at £423, and 109 tons of cornflour were manufactured valued at £3,435. These figures do not appear to point to any large demand for the white variety of maize, and offer no encouragement for increasing the cultivation.

We have mentioned the use of maize meal mixed with wheat flour for bread. According to Bowman and Crossley, "Flour so adulterated yields fewer loaves than an equal amount of pure wheat flour, and the bread produced is more moist than wheat bread and has a tendency to be sodden. An addition of 10 per cent. of maize flour is calculated to mean a reduction of five loaves on the sack." Another point is that, in the writer's experience, the admixture of maize meal with flour causes the bread to quickly become dry, if kept for any undue length of time, as is sometimes necessary in the bush.

Several articles are prepared from maize—notably cornflour, maizena, maize starch, maize oil, and, more largely, glucose, which is prepared from maize starch by conversion into grape sugar, and is used largely as an adulterant for cane sugar. In Melbourne a large glucose factory has been established, capable of treating 150,000 bushels of maize per annum.

The Department has imported some of the choicest varieties of white maize from America from time to time, and recently secured 2 bushels of seed of a standard type ("Boone County White") from Kansas, U.S.A., with the express object of raising seed grain for next season's planting, with a view to supplying farmers with reliable seed.

Amongst the white varieties, Hickory King is a very valuable and reliable field corn, having a large grain, and is the smallest cobbed pure white Dent in the world. The grain is so large and the cob so small that, by breaking the ear in half, one grain will cover the entire end of the cob. The ears grow 7 to 9 in. in length and 6¼ to 6½ in. in circumference, and are generally borne 3 to 6 on one stalk, thus making it enormously productive. It ripens early, maturing in 110 days from planting. It is particularly adapted to and will yield more in thin soils than any other variety of field corn, and, if planted on good soil, will bear much closer planting than other varieties, as the stalks are of medium growth. Wherever it has been grown it has given universal satisfaction.

## FOOD VALUE OF MAIZE AS COMPARED WITH WHEAT.

[Compiled from Burtt-Davy's Recent Publication on Maize.]

Prepared in various ways, maize forms an important article of diet for the American people.

Considered as a food, maize is highly nutritious, digestible, and, when properly prepared, is wholesome. The total amount of digestible

nutrients is only excelled by wheat, the latter containing, approximately, 2 per cent. more than the former.

TABLE SHOWING DIGESTIBLE NUTRIENTS IN 100 LB. OF WHEAT AND MAIZE.

| — | Protein. | Carbo-Hydrates. | Food. | Total. |
|---|---|---|---|---|
| Wheat ... ... ... | 10·2 | 69·2 | 1·7 | 81·1 lb. |
| Maize ... ... ... | 7·9 | 66·7 | 4·3 | 78·9 lb. |

Two kinds of meal are usually prepared from maize—

(1) Whole meal, in which the embryo is ground up with the endosperm;

(2) The new process meal, in which the embryo as well as the hull is removed by special machinery.

Owing to the amount of oil it contains. the old-fashioned whole meal does not keep as well in hot weather as the new process maize meal, for the embryo holds 82 per cent. of the total oil-content of the grain, but the higher oil-content, on the other hand, adds greatly to the food value in cold weather.

Ordinary maize meal is classified into white and yellow, and graded into coarse, medium, and fine.

### CONSUMPTION IN THE UNITED KINGDOM.

Of the maize meal exported from the United States of America in 1904, 21·32 per cent. was sent to the United Kingdom.

### ARTICLES PREPARED FROM MAIZE.

Cornflour, maizena, &c., consist mainly of starch, much of the proteid and mineral matter having been removed by treatment with dilute alkaline solutions. These forms of maize starch are used largely in the preparation of puddings, blancmanges, &c.

#### *Maize Starch.*

The finer qualities are largely used as substitutes for arrowroot. Maize starch is used as an adulterant to wheat flour, and is sold at a correspondingly low figure; but the pure food laws of most countries require that the fact of the mixture is clearly defined. We have already stated that glucose is the largest single product prepared from maize starch, which is used as an adulterant for cane syrup, or is put up as corn syrup, when this latter has been sweetened with a small percentage (10 per cent.) of cane syrup.

The varieties of white maize now under cultivation in Queensland are all more or less adapted to coastal conditions.

# Pastoral.

## SPECIFICATION OF LABOUR AND MATERIAL REQUIRED IN THE CONSTRUCTION OF A SHOWER SPRAY FOR THE TREATMENT OF 250 SHEEP PER HOUR, AS RECOMMENDED BY THE DEPARTMENT OF AGRICULTURE AND STOCK.

The size of the tray shown on accompanying plan is 13 ft. 6 in. long by 6 ft. 6 in. wide, and this will regulate the position of the posts and fences accordingly.

Posts should be of sound hardwood (Ironbark preferred) 6 in. in diameter, 9 ft. long, set 3 ft. in the ground perfectly plumb every way, and filled in and well rammed.

Top plates may be of 6-in. round timber, checked, scarfed, and bolted into posts, or 5-in. by 4-in. sawn hardwood checked and bolted to posts, as may be most convenient.

Joists on top to be 6-in. by 2-in. sawn hardwood spaced 18-in. centre to centre, checked into top plates and well spiked.

Rails to be 4-in. round hardwood, or 4-in. by 2-in. sawn hardwood if preferred, to be 3 in number on each side, checked into and spiked to posts.

Provide and fix 4-in. joists under floor, embedded in the ground, about 18-in. centres for nailing iron flooring to.

Provide also a round hardwood rail to protect galvanised spouting for collecting liquid from floor.

Frame the gates as shown with 3-in. by 1-in. hardwood double heads and heels and 3-in. bars and braces all bolted together and hung with light hooks and bands, and fitted with strong bar bolts as directed.

Build the yard fences as shown, or as required by the proprietor.

Provide 22-gauge galvanised-iron tray as shown on top, turned up 6 in. at sides and ends, finished with a strong bead at top edge perforated with No. 10 gauge holes every 3 in. apart at bottom, to be made in two or three sections as required and bolted together at joints with a piece of felting between; screw same to floor joists as directed.

Lay the floor with 22-gauge galvanised corrugated iron with a fall of 2 in. from the high side, to have 1½ corrugation lap, with felt in between, and fix to same a 4-in. by 3-in. 22-gauge galvanised iron spouting with a 2-in. waste pipe from same; provide all stop ends, &c., necessary.

Provide and fix a No. 8 Semi-Rotary pump or other approved force and lift pump, with 2-in. suction and delivery pipes with a back-flow valve on bottom of suction pipe; provide all bends, sockets, and fittings necessary.

Provide and fix in position shown a 400-gallon corrugated galvanised-iron tank let into the ground and encased in 4 in. of concrete. Provide a 1-in. hardwood cover for same, with strong ledges.

A 400-gallon ship's tank may be substituted for the above if preferred, when no cover will be required.

Leave all satisfactory at completion.

Double the number of sheep may be sprayed by simply doubling the length, and adding another pump.

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## THE SHEEP BLOW-FLY.

By A. H. CORY, M.R.C.V.S., Deputy Chief Inspector of Stock.

### SOME RESULTS OF DIPPING EXPERIMENTS.

One of the experiments initiated by the Department of Agriculture and Stock at Gindie State Farm has reached a stage when some of its results may be indicated.

One fact has to be borne in mind, and that is—the season since April last to June has been exceedingly dry, and, in consequence, flies did not put in an appearance until later, either at Gindie State Farm or the district generally. It will be necessary, therefore, that this particular experiment be repeated in the coming year.

The experiments are designed to test the question whether dipping is beneficial in regard to the prevention of losses in sheep by blow-flies. To that end 645 sheep were purchased by the Department in April last.

These sheep were all ewes which had not been joined with the rams, were aged from 18 months to 3 years, and had about two months' wool on their backs at the time of purchase.

A shower dip on the Tandawanna principle was erected, and the sheep thoroughly saturated with the various makes of dip (ten in number) which were offered.

The sheep were drenched for worms on the 15th of April, and on the 17th of that month were dipped. Fifty animals were treated with each dip, and 145 were kept as controls—*i.e.*, not treated at all. That is, there were 500 dipped sheep and 145 untreated.

There were present at the operations Mr. W. G. Brown (State Sheep and Wool Expert) and Mr. Robert Jarrott (then manager of Gindie State Farm) and myself. After being dipped, rams were put with the ewes and left with them for seven weeks, the whole flock being watched daily by Mr. Jarrott or his assistants, and inspected thoroughly, weekly, by Mr. W. G. Brown. No flies were seen until rain fell in June (344 points), and then in only a few cases which quickly recovered, the flies dying off.

On 27th August the Acting Manager (Mr. E. Batts) reported that flies were beginning to work amongst the experimental sheep; and from the 1st September until 16th October the sheep were closely inspected once a week by Mr. Brown, besides being closely watched by Mr. Batts.

There was a fall of 432 points of rain on 8th, 9th, and 10th October; and, therefore, a big proportion of the sheep were seen to be blown.

Fearing that big losses would take place, and seeing that there was then about eight months' fleece on the sheep, Mr. Brown decided to crutch the sheep. On the 16th October, therefore, the sheep were crutched, and every sheep carefully examined, marks recorded, and the condition of each animal carefully noted. This latter in the case of blown sheep was recorded "badly blown, slightly blown, freshly blown on old infestation, and not blown at all in respective cases." The table containing the analysis of each lot of sheep will be seen below.

There were several deaths—5 to be exact—and these died during the six months from causes unconnected with flies; 9 were missing through breaking into neighbouring paddocks, leaving a balance of 631 sheep examined, whose condition was recorded.

It was found on inspection that the main attack of flies came after the 8th of October; and it is noteworthy that the flies attacked the sheep during the period when lambs were falling or about to fall.

The results so far as shown by the figures are:—

A total of 631 were examined.

A total of 167 were more or less seriously blown = 26·44 per cent.

A total of 92 were blown in 491 dipped sheep = 18·73 per cent.

A total of 75 were blown in 140 undipped sheep = 53·67 per cent. On these figures, therefore, it seems as if dipping the sheep gives a certain amount of protection. True, the sheep do not escape being blown, but inspection of the blown animals shows that the undipped sheep suffer in a far greater measure than those dipped.

One other fact seems to have emerged, and that is—it was only when the ewes began to lamb that the flies began to work seriously. The sheep will be shorn in January, and another test made in the same manner as the first one. If the results approximate to those of this first experiment, then another palliative will positively be added to what we know.

When the sheep are shorn in January, close attention will be paid to the results on the wool of the various lots of sheep treated by the dips used, as up to the present time there is some conflict of opinion in regard to the relative values of the dips used.

| Name of Dip. | Number Dipped. | Total Number Blown. | Number on Back and Ear. | Marking on Body of Sheep. | Infested after 1st September. | Infested since 8th October. | Infested, but wholly Dried Out. | Infested, Dried Up, and Re-infested. | Badly Infested. | Rainfall since Dipping. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A .. .. .. | 50 | 12 | 1 | Red ring on back .. | None | 5 | 6 | 1 | 1 | June — 344 points | Recently blown sheep were in nearly every instance blown at root of tail, or the udder. |
| B .. .. .. | 50 | 6 | 2 | Red ring off rump .. | 1 | 5 | None | None | None | | |
| C .. .. .. | 50 | 11 | 3 | Red ring back of head | None | 4 | 3 | None | 4 | | |
| D .. .. .. | 50 | 9 | 4 | red ring near rump | 5 | 6 | None | 4 | 3 | .. | "Badly infested" means that the whole breach is involved. |
| E .. .. .. | 50 | 9 | 5 | red ring forehead .. | None | 9 | None | None | 4 | October 8, 9, and 10— 432 points | |
| F .. .. .. | 50 | 11 | 6 | Red ring top of shoulder | 2 | 10 | 1 | None | 1 | .. | The undipped sheep show very much more extended areas of damage than the dipped sheep. |
| Ga .. .. .. | 50 | 8F ? 10 | 7 | Red stroke along back | 1 | 8 | 1 | 2 | 3 | | |
| Gb .. .. .. | 50 | 8 | 81 | Stroke between ears | 1 | 8 | None | 2 | None | | |
| Ha .. .. | 50 | 8 | 9 | Red ring top of rump | 2 | 8 | None | 4 | None | | |
| Hb .. .. .. | 50 | 8 | 10 | Bar across back ... | 3 | 6 | None | 7 | 4 | | |
| Controls undipped .. | 145 | 75 | End of book | No mark .. | 42 | 70 | 3 | 9 | 34 | | |

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF NOVEMBER, 1914.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Miss Edition | Jersey ... ... | 10 July, 1914 | 732 | 5·0 | 43·18 | |
| Nellie ... | Shorthorn... ... | 20 July ,, | 992 | 3·6 | 41·76 | |
| Glen ... | ,, ... ... | 26 Oct. ,, | 841 | 4·2 | 41·45 | |
| Madam Melba | Holstein ... ... | 8 Sept. ,, | 1,076 | 3·2 | 40·17 | |
| Lark ... | Ayrshire ... ... | 27 July ,, | 802 | 4·0 | 37·61 | |
| Honeycombe | Shorthorn... ... | 23 Sept. ,, | 870 | 3·6 | 36·63 | |
| Rossbud ... | Ayrshire ... ... | 20 Sept. ,, | 960 | 3·2 | 35·80 | |
| Bluebelle ... | Jersey ... ... | 27 May ,, | 612 | 4·6 | 33·17 | |
| Miss Lark ... | Ayrshire ... ... | 31 Oct. ,, | 669 | 3·8 | 29·77 | |
| Countess of Brunswick | Shorthorn... ... | 26 July ,, | 642 | 3·9 | 29·33 | |
| Lady Spec ... | Ayrshire ... ... | 24 Oct. ,, | 641 | 3·9 | 29·28 | |
| Pauline ... | Shorthorn ... | 12 Oct. ,, | 732 | 3·4 | 29·05 | |
| Lady Lil ... | Jersey ... ... | 22 Aug. ,, | 467 | 5·2 | 28 67 | |
| Silver Nell... | Shorthorn ... | 5 Oct. ,, | 680 | 3·6 | 28·63 | |
| Sweet Meadows | Jersey ... ... | 28 July ,, | 478 | 5·0 | 28·20 | |
| La Hurette | ,, ... ... | No records ... | 451 | 5·2 | 27·69 | |
| Hope | | | | | | |
| Lady Melba | Holstein ... ... | 6 Mar., 1914 | 694 | 3·4 | 27·54 | |
| Burton's Lady | Shorthorn ... | 23 July ,, | 638 | 3·5 | 26·08 | |
| Miss Bell ... | Jersey ... ... | 13 Aug. ,, | 449 | 3·5 | 25 18 | |
| Lady Margaret | Ayrshire ... ... | 19 June ,, | 609 | 3·5 | 24·90 | |
| Auntie ... | ,, ... ... | 26 June ,, | 554 | 3·8 | 24·64 | |
| Lady Dorset | ,, ... ... | 20 Sept. ,, | 594 | 3·5 | 24·29 | |
| Lady Athol | Shorthorn... ... | 10 July ,, | 555 | 3·8 | 23·36 | |
| Davidina ... | Ayrshire ... ... | 17 July ,, | 597 | 3·2 | 22·27 | |
| Lowla II. .. | Shorth'rn-Ayrshire | 23 Sept, ,, | 643 | 3·0 | 22·43 | |
| Cocoatina ... | Jersey ... ... | 20 April ,, | 370 | 5·0 | 21·83 | |
| Lucinda ... | Ayrshire ... ... | 20 Sept. ,, | 602 | 3·1 | 21·73 | |
| Gretchen ... | Holstein ... ... | 6 May ,, | 529 | 3·4 | 21·00 | |
| Rosine ... | Ayrshire ... ... | 29 Sept. ,, | 489 | 3·6 | 20·58 | |

## THE COMMONWEALTH STANDARD JERSEY HERD BOOK.

We are indebted to Mr. Alfred Gorrie (editor and publisher of a very valuable publication under the above title) for the first volume of a work which has occupied two years—years devoted to the inspection of animals and verifying pedigrees. Mr. Gorrie, who is well known in Queensland, has been for twenty-three years constantly associated with Jersey cattle, and during that time has collected and indexed particulars of pedigrees and performances of a very large number of Jersey cattle. His object has been to produce a herd book of this breed with a standard of admission so fixed as to exclude animals graded from the common herd. The necessity for such a book has long been felt, and the Commonwealth Standard Jersey Herd Book appears to supply that need as a reliable index to Jersey cattle in Australia of absolute and undoubted purity.

Many breeders of Jerseys take a pride in developing herds from pure foundations—others do not. The latter keep one or two pure animals and a large number which they have graded up from the common herd, and from these they rear as many bulls and heifers as it is possible for them to find buyers for; and they thus depend for their profits on the sales of stock instead of from the production of milk and butter from their herds.

The registration in Australian herd books of animals without pedigree and others bred from the common herd has had a most damaging effect on the Jersey breed. Most dairymen know that it is a very retrograde practice to use a grade bull; but many such are in use at present, because buyers have been led to believe that animals registered in herd books are pure, and, not being able to investigate the pedigrees of their purchases, have ruined their herds by the introduction of impure animals.

The Commonwealth Standard Jersey Herd Book is not only a reliable and faithful index of purebred Jersey cattle in Australia, but as a genealogical book of reference is probably the most complete herd book in the world. Pedigrees are fully tabulated back to the sixth generation, and all animals have been inspected and approved of by the editor, so that each animal registered is not only of pure descent but of choice individuality as well. The performances of animals as well as those of their ancestors have been investigated and are published with their pedigrees. These performances, indicating as they do the dairy prepotency of certain strains, will help dairymen considerably in the selection of stud animals. The data contained in the book concerning almost every good Jersey animal in Australia is such as gives it a rare value to Jersey cattle-breeders and all others who are taking up dairying as a means of livelihood and are determined to get the highest financial result which the Jersey breed returns.

As an illustration of the class of animal registered in the Commonwealth Standard Jersey Herd Book and the capacity of the pure Jersey cow for butter production, the test of Mr. Samuel Hordern's "Leda's Snowdrop" is valuable. She was tested by the New South Government for twelve months, during which time her official returns show that she produced 11,886 lb. of milk and 796½ lb. of butter. Her age at the commencement of the test was 10½ years. Such a return shows how splendidly adapted the purebred Jersey cow is for heavy and continuous milk and butter production, and should encourage all dairymen to secure absolutely pure animals of the producing strain, and thus place themselves in positions favourable for developing animals of the producing qualities of "Leda's Snowdrop."

The Commonwealth Standard Jersey Herd Book can be obtained from the publisher; price, £1 1s. per volume. The herd book under notice is well got up, well printed, and profusely illustrated, and contains entries of absolutely purebred Jersey cattle approved as typical animals, whose pedigrees trace in unbroken lines to foundations bred in Jersey herds recognised as pure prior to 1888.

# The Horse.

## HOW TO TREAT A FISTULA.

When a fistula on withers is forming, it is customary to apply a blister or hot fomentations. This on rare occasions appears to effect a cure, but in the majority of cases it hastens the swelling and brings it to a head. After it has broken, surgical treatment is required.

The next thing is to find out the direction and depth of the fistula. This is done by using a flexible probe, some 8 or 9 in. in length. Free drainage must now be given by opening along the full length of the probe, or, if thought advisable, an opening can be made at the lower part of probe, and a seton of tape or other material passed through and tied on the outside. A seton keeps the wound open and assists in draining the cavity, but the first method of opening up is generally found more satisfactory. Both sides of the withers should be opened, if necessary, and any necrosed (dead) tissue removed. The top of withers should not be opened crossways (from side to side), because there is a ligament which runs along the middle line of shoulders from the head—if cut, causes serious consequences.

The chief points to remember are:—Free drainage, the removal of all dead tissue, and the prevention of pockets where pus can accumulate.

The following lotion should be used every third day on the fistula after it has been opened up, until four applications have been applied:—

| | |
|---|---|
| Corrosive sublimate .. .. .. .. .. | ½ oz. |
| Methylated spirit .. .. .. .. .. | 1 pint. |

This is best applied by soaking some cotton wool or other absorbent material with the lotion, then packing the saturated cotton wool in the fistula. This treatment can be repeated, if necessary, after 10 or 14 days' interval. Knives, probes, &c., should be thoroughly disinfected before using by placing them in boiling water or some disinfectant such as carbolic acid, Condy's fluid, &c. Knives and other steel instruments should not be allowed to come in contact with the corrosive sublimate solution.

## SHRINKAGE OF WOOL WEIGHTS IN STORE.

By an oversight, we omitted to state that the article on shrinkage of wool, published in the December issue of the Journal (1914), was supplied by Mr. W. G. Brown, Sheep and Wool Expert of the Department of Agriculture and Stock.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, NOVEMBER, 1914.

During the month 5,748 eggs were laid. Broodies have been very numerous. The weather, too, has been trying, a temperature of 107·5 degrees having been recorded on the 26th. Mr. Murchie lost a bird on the above date through heat appoplexy, but we managed to save the others by throwing water on the houses. Green food being now scarce, we shall have to commence to use lucerne chaff as a substitute. Loloma Poultry Farm's White Leghorns win the monthly prize with 169 eggs. The following are the individual records:—

| Competitors. | Breed. | Nov. | Total. |
|---|---|---|---|
| A. T. Coomber ... ... ... ... | White Leghorns .... | 154 | 1,045 |
| T. Fanning ... ... ... ... ... | Do. ... ... | 145 | 1,041 |
| Loloma Poultry Farm, N.S.W. ... ... | Do. ... ... | 169 | 995 |
| Moritz Bros., S.A. ... ... ... | Do. ... ... | 163 | 992 |
| Kelvin Poultry Farm ... ... ... | Do. ... ... | 123 | 965 |
| Loloma Poultry Farm, N.S.W. ... ... | Rhode Island Reds ... | 130 | 950 |
| Geo. Tomlinson ... ... ... ... | White Leghorns ... | 150 | 948 |
| Cowan Bros., N.S.W. ... ... ... | Do. ... ... | 150 | 938 |
| R. Burns ... .. ... ... ... | Black Orpingtons (No. 1) | 132 | 933 |
| A. F. Camkin, N.S.W. ... ... ... | White Leghorns ... | 158 | 909 |
| E. Le Breton ... ... ... | Do. ... ... | 137 | 902 |
| A. H. Padman, S.A. ... ... .. | Do. ... ... | 159 | 902 |
| J. T. Coates ... .. ... ... | Black Orpingtons ... | 129 | 897 |
| Mrs. Munro ... ... ... ... | White Leghorns ... | 165 | 893 |
| R. Burns ... ... ... ... ... | S. L. Wyandottes ... | 129 | 892 |
| Mrs. Bieber ... ... ... ... | Brown Leghorns ... | 148 | 890 |
| T. Fanning ... ... ... ... ... | Black Orpingtons ... | 157 | 884 |
| J. R. Wilson ... ... ... ... | White Leghorns ... | 145 | 884 |
| Marville Poultry Farm, Victoria ... | Do. ... ... | 161 | 884 |
| R. Burns ... .. ... ... ... | Black Orpingtons (No. 2) | 141 | 884 |
| J. Franklin ... ... ... ... | White Leghorns ... | 153 | 871 |
| Derrylin Poultry Farm ... ... ... | Do. ... ... | 150 | 868 |
| J. T. Coates ... ... ... ... | Do. ... ... | 147 | 861 |
| F. McCauley ... ... ... ... | Do. ... ... | 149 | 856 |
| E. V. Bennett, S.A. ... ... ... | Do. ... ... | 134 | 854 |
| G. E. Austin ... ... ... ... | Do. ... ... | 139 | 850 |
| J. Gosley .. ... ... ... ... | Do. ... ... | 136 | 852 |
| R. Jobling, N.S.W. ... ... ... | Do. ... ... | 136 | 854 |
| J. Manson ... ... ... ... ... | Do. (No. 1) | 141 | 840 |
| J. Kilroe ... ... ... ... ... | Do. (No. 2) | 151 | 832 |
| J. D. Nicholson, N.S.W. .. ... ... | Do. ... ... | 121 | 820 |
| Range Poultry Farm ... ... ... | Do. ... ... | 140 | 810 |
| Mrs. Bradburne, N.S.W. ... ... | Do. ... ... | 139 | 810 |
| D. Moreton, N.S.W. ... ... ... | Do. ... .. | 140 | 807 |
| J. Zahl ... ... ... ... ... | Do. ... ... | 147 | 801 |
| J. Kilroe ... ... ... ... ... | Do. (No. 1) | 125 | 789 |
| C. M. Jones ... ... ... ... | Do. ... ... | 147 | 787 |
| J. N. Waugh, N.S.W. ... ... ... | Do. ... ... | 133 | 767 |
| J. Murchie ... ... ... ... ... | Brown Leghorns ... | 140 | 753 |
| J. M. Manson ... ... ... ... | White Leghorns (No. 2) | 135 | 742 |
| Totals ... ... ... ... | ... | 5,748 | 35,053 |

Owing to the transposition of two figures, an error was made in last month's grand total; it should be 29,304 instead of 23,904.

# The Orchard.

## DIE-BACK OF CITRUS TREES IN THE NORTHERN DISTRICTS.

By G. WILLIAMS, F.R.H.S., Cairns.

The characteristics of the above malady are, unfortunately, but too well known, and, with allied more or less obscure affections, have caused serious losses in citrus orchards. Investigations in respect of origin and remedial treatments suggested have not shown any appreciable results. From what has been published it would appear that principal attention had been given to affected trees, and but little bestowed upon those in infested districts as were almost or entirely free from external indications. From the latter, comparisons may be made and the effects of immediate environment with the influences exercised in the prevention of or in minimising the effect of disease. The establishment in diseased trees being effected before external indications are manifested, prevention will be preferable to subsequent treatment. Sprays of different formulas have been recommended from various sources; but, as the malady shows no sign of abatement, either the formulas are ineffective or indifferently applied, and better results will undoubtedly follow future plantings by avoidance of known favourable agencies for its progress. Amongst these are:—Primarily, soil of a heavy nature; a close, retentive, or impervious subsoil, giving rise to the effect of extremes of dry and moist conditions (an undue percentage of "clay" exercises similar influence) with insufficient drainage, lack of cultivation, over-manuring, excessive irrigation, and also working on unsuitable stock. Drainage is a most important feature, citrus being very deep rooted, and no artificial system is applicable to remedy a natural deficiency. In its absence an even state of moisture cannot be maintained. Where different classes of soil, particularly those of a widely different nature, are included in one orchard, and it is noted that trees planted in one class are healthy and vigorous, whilst in another they are badly attacked, the suggestion arises that to the unsuitability of such soil is almost, if not entirely, attributable the cause of the trouble. Wider observations and comparisons afford the fullest confirmation. Trees planted in light loam of good depth remain immune, and, even when cultivation is neglected, show but very slight indication of attack; but where a dense constituency prevails some of the known features favourable to the disease are an invariable accompaniment. Its presence is eventually manifested in a varying extent—even to killing the trees outright. In consideration of suitable soils, examination must go much below the surface. On alluvial flats with a surface of loose sandy soil, a subsoil of heavy nature is not infrequently met with, and in such situations trees flourish but for a limited time. The trees being evergreen and almost constantly active, sustaining uninterrupted evaporation from their leaf surfaces, they must always be provided with moisture or disease will result to tree or fruit. Without

excessive rainfall, the requisite supply of moisture can be retained in a suitable soil by cultivation; but where an unbroken surface, or grass or other weeds are permitted, a corresponding depression exists. The theory of maintaining moisture by surface cultivation has been frequently explained. Exact determination of moisture present during a dry month, at depths of the soil from 1 ft. to 6 ft., shows a gain of almost 50 per cent. where cultivation prevails. Moreover, in cultivated land the water in lower soil is held for the use of roots, and as fast as absorbed by them the supply is replaced through the firm soil below, which, evaporation being stopped, remains moist and permeable by the roots. In planting worked trees the influence of stock, though a most important one, is seldom considered. Experience further confirms the observations of Mr. H. Tryon—that oranges worked on rough lemon stock are the most susceptible to attack. The liability of the Lisbon lemon so worked is much more pronounced. Seedling trees have been quoted as comparatively immune, but this is erroneous. Young trees, both orange and mandarin, where planted in retentive scrub soil, are found to be very seriously affected at two and three years old. Planting trees in holes below the level of surrounding surface, or so that they will sink below that level, is very detrimental. The essentials to maintaining the trees healthy are:—A suitable soil of sufficient depth and drainage, with an even supply of moisture (mainly attainable by systematic cultivation) and reasonable attention in all details. Choice of varieties may have some influence according to vigour and constitution of the subject.

# State Farms.

## KAMERUNGA STATE NURSERY.

### MANAGER'S REPORT FOR OCTOBER, 1914.

Rainfall for the month, 371 points.

Number of days on which rain fell, 16.

Weather during the last week has been hot and steamy.

Coffee is now bearing its second crop of flowers, and all the young trees look well, the foliage being a rich dark green; and, owing to the moist conditions, it is hard to distinguish between the manured and unmanured trees. The ground should be kept clean, and, where possible, mulch round the trees.

*Vanilla.*—The weather has been most favourable for the growth of vines. Those two years old are flowering freely, and the pods are setting well. All flowers are being pollinated. Thinning out of pods will be done later.

Gingers, turmeric, arrowroots, and yams should be planted now.

# Animal Pathology.

## CAN THE CATTLE TICK BE EXTERMINATED IN QUEENSLAND?

By P. R. GORDON.

After a careful study of Mr. Pound's report on what has been accomplished in the way of exterminating the cattle tick in some of the American States, it has occurred to me that my extenisve practical experience in the successful extirpation of the sheep scap Acarus in Australia may supply some useful hints in an endeavour to carry out a similar work in respect to the cattle tick. I should premise that, up to 1866, New South Wales and South Australia were the only two colonies of the Australasian group that had effectually banished scab from their flocks. Victoria and Tasmania were not free from the disease until well on in the eighties, and New Zealand not until 1892. In the early fifties New South Wales stamped out the disease by the slaughter of all infected and contact sheep, compensating the owners from a fund formed by a levy on all sheep within that colony, and the flocks remained free from the disease until 1863, when some scabbed sheep on vessels trading between Melbourne and Newcastle had accumulated in a butcher's paddock at the latter port, and were sold to a dealer, who travelled them north towards the Queensland border, infecting all the flocks along their route; and, as South Australia had, a year or two prior to that date, cleared her pastures of the disease without the slaughter of the diseased sheep, the New South Wales Government hurriedly passed an Act similar to that in force in South Australia, appointed the late Mr. Alexander Bruce to be Chief Inspector under the Act, and I was appointed as his deputy—to act at headquarters during his tours of inspection, and to carry out country inspections when his presence was necessitated in the capital. The Act came into operation on 1st January, 1864, and the disease was completely exterminated in eighteen months, and the colony proclaimed clean in 1866. This feat was brought about solely and entirely by the Act having been administered by Mr. Bruce by a determined insistence on all its provisions being carried out in their integrity, the money penalties for laxity or neglect having been heavier than those under any other Act, the Customs Act alone excepted. There were several specifics reported to have been effective in killing the scab Acari; but the greatest difficulty hitherto had been to find one that would effectually kill the Acari, and at the same time act as a preventive of reinfection. The tobacco and sulphur dip—first brought into notice by Mr. John Rutherford, Victoria—was found to be the most reliable (up to that

date, at least), and was adopted as the Government dip; the use of all other specifics having been strictly prohibited. On the preventive measures depended the whole success of the treatment, as will be the case with the cattle tick. As already stated, the tobacco infusion was found most reliable in the destruction of the scab insect, but the sheep were liable to reinfection from trees, fencing posts, yards, &c., against which sheep had rubbed, so that the flowers of sulphur mixed with the tobacco infusion, and which was kept continually stirred up in the bath, so peppered the fleeces as to prevent reinfection for a period of six months, by which time all Acari on trees, fences, &c., had died off. But two dippings within an interval of from fourteen to twenty days were found to be necessary, because a study of the life history of the Acarus showed that when introduced on a sheep it, at once, burrowed under the exterior cuticle, reappearing in thirteen days with its numerous progeny attached to its legs, the lymph exuded causing pustules, which, breaking, formed scabs—whence its popular name, so that at the time of first dipping it almost invariably happened that many Acari were in a partial state of development under the surface of the skin, and could not be reached by the medicaments. Mr. Bruce resisted all applications of owners and agents of proprietary dips—and many such were made to the Government—to even submit their specific to a test for the reason not alone that the tobacco and sulphur dip, which was prepared under the surveillance of officers of the Department, but also because in the case of proprietary dips—many of which had failed to be effective—the ingredients of which they were composed were not made public; and the wisdom of this will be made plain by a circumstance that occurred some eighteen years later on. Now, in any attempt to stamp out the cattle tick in Queensland a means of preventing reinfestment for a certain time, to be ascertained, must, as with sheep scab, be of the very first importance. In America they have a natural means to that end in their meteorological conditions which are absent in Queensland, and, therefore, it will be necessary, as was our case with sheep scab, to set up an artificial means of prevention; and even if such is discovered, I strongly question whether extermination can be attained until all large grazing holdings have been subdivided into smaller properties and all cattle compulsorily kept within fences. From my experiences of sheep scab as related above, I would strongly recommend that the use of all proprietary dips for cattle tick be prohibited, and only the Government dip be allowed, unless the component parts of those dips be fully described to the Department's Analyst. My experience while in office of many of these proprietary dips was that most of them at least were merely the Departmental dip, with the addition of some ingredients which had no effect beyond increasing the cost of the dip. The extermination of the

ticks should be the one and only aim, and not to be side-tracked by any other consideration. I am, of course, aware that since the time when sheep scab was exterminated several effective sheep dips have been placed on the market; but, in strong support of Mr. Bruce's action in prohibiting the use of proprietary dips at the time, the following well-known circumstance occurred in 1884 or 1885:—It may be in the recollections of many sheepowners that about that date some sheep imported from America, which had passed through the Sydney quarantine and duly disinfected under the then Government Veterinary Surgeon (the late Mr. Willows) were sold to a well-known pastoralist, then of New South Wales, now of Queensland, and taken to his run, where soon afterwards they developed scab and were destroyed by order of the Government. The cost of destruction, the cleansing of the run, compensation to the owner, and legal expenses involved the Government in an outlay of over £80,000. The veterinary surgeon was dismissed the service. Mr. Bruce was suspended, and only reinstated on account of the many and valuable services to the pastoral industry that had been carried out on his initiative; and the dip the veterinary had used with the sheep, although then and still a valuable disinfecting fluid, and advertised as an efficient sheep dip, had "but scotched the snake, not killed it."

## THE NATIVE TAMARIND.

Mr. F. Claussen, head teacher of the Brookfield State School, brought to this office a sample of a native fruit, locally known as the Native Tamarind (*Diploglottis Cunninghamii*). We submitted the fruit to Mr. C. Ross, Instructor in Fruit Culture, and he has furnished the following notes on it:—

"The fruits submitted are what are called 'The Native Tamarind'; botanically, *Diploglottis Cunninghamii*. I have seen the tree growing in the coastal scrubs and mountains further inland from North to South of Queensland. In some situations it grows to a fairly large tree. The young shoots, panicles, and leaf stalks are covered with soft, brownish hairs. The shape and size of the leaves vary on the same tree, ranging from 6 in. to over 12 in. in length. The fruit is borne in panicles, each fruit being enclosed in a round casing within which is a seed surrounded by an amber-coloured, juicy pulp of a brisk, pleasant, acid flavour. It is a useful dessert fruit, and excellent for conserves and jam."

# Vegetable Pathology.

## ONION WHITE BLAST.

BY H. TRYON, Government Entomologist and Vegetable Pathologist.

The so-called blight affecting the onion crop in the Memerambi district, illustrated by the specimens transmitted, is a special injury due to the attacks of a small pale green, elongated insect belonging to the family Thysanoptera (fringe wing flies) whose members are spoken of as "Thrips."

This depredator concerned occurs in very large numbers at the bases of the leaves ensconced in the narrow interstices that exists between one and another.

The particular species of Thrips concerned cannot be as yet ascertained, since none of the winged adults occur in the sending, although the larval ones still attached to it are quite numerous. However, its identification is important, as this will throw light on the range of its food habits, and so possibly indicate sources whence it may have emanated, and to which, therefore, attention might be profitably given when devising repressive measures.

The injury is occasioned by the exercise of the biting habit of the Thrips, each bite originating a small gray spot and these spots becoming so numerous that the foliage, after first discharging its green colour, dies and becomes brown. Obviously, the oldest parts manifest the more severe injuries; thus the first-formed leaves succumb prior to the others, and the tips of the leaves die first, parts more and more back successively being implicated in the destructive damage.

Originally the insect is borne to the subsequently affected plant through the air on the wing, and so it becomes dispersed. Again, possibly, other truck plants might serve to originate the trouble, since many species of Thrips are general feeders.

A few insects, if overlooked, may soon, in the course of natural increase, give rise to a numerous host. The entire life from the egg upwards may be spent on the plant once adopted for a residence and feeding ground.

Once one sees the small whitish specks on the foliage of the onion, one may suspect the presence of Thrips, and, if it be present, the act of tearing the foliage apart will reveal the minute green elongated insects.

This "White Blast," as the disease may be designated, is evidently far worse than it would otherwise be owing to the prevalent drought; for dry conditions, whilst unfavourable to the onion plant, are conducive to the rapid multiplication of the onion Thrips, its enemy.

## REMEDIES.

In dealing with the onion Thrips it must be remembered we have before us a very delicate hostplant. Therefore, the remedies that are most suitable for coping with insects of the class when occurring on fruit trees are not admissible in its case.

There are grounds, however, for concluding that even a slightly potent contact-insecticide will destroy it—for example, some application in which tobacco forms an essential ingredient; especially a soap containing nicotine.

Should the farmer have any tobacco growing (and everyone should have a little of this useful insecticide) he should roughly cure it, make a tea or decoction of it (1 lb. of tobacco in 2 gallons diluted to 4 gallons), and use this as a spray, adding a little soap or molasses to promote adhesion; or he might employ tobacco extract, and use this diluted.

Tobacco extract sometimes contains 40 per cent. of nicotine, and when of this strength should be blended with water in the proportion of 1 pint in 1,800. There is another form in which nicotine containing 60 per cent. may be used. Formerly a tobacco extract named "Rose Leaf," having a definite value in nicotine, was obtainable here. This, mixed with water in the proportion of 1 in 24, should be a very efficacious destroyer of the Onion Thrips.

The tobacco dust, if obtainable, is another form in which this nicotine-containing body may be used. It should be placed in a tin having its mouth covered with closely woven iron gauze, and simply dusted well into the hearts of the plants, care being taken lest the powder gets wet. Even at this late date, however, it appears that some good might attend its application.

I have dwelt upon the use of tobacco, since, especially when used as a basis in any spray wash, it will prove serviceable; but ones containing white oil soap and kerosene emulsion, too, might have been advocated. But both are liable to do injury, especially if not well made or applied when the light is strong.

# Botany.

## CONTRIBUTIONS TO THE FLORA OF QUEENSLAND AND BRITISH NEW GUINEA.

BY F. MANSON BAILEY, C.M.G., F.L.S., Colonial Botanist.

### Order RUTACEÆ.

ATALANTIA, Corr.

**A. glauca,** *Hook. f.* var. **inermis,** *Bail. n. var.*

Dr. Lindley, the first botanist to describe the species, speaks of the plant as spinous (Mitch. Trop. Austr., p. 353). Bentham in the "Flora Australiensis," 1, p. 370, however, speaks of the plant as "often armed with straight or recurved spines," and subsequent writers have united the spinous and spineless varieties, but I have received specimens of the latter from the above two localities and consider it advisable to attach to the latter a distinctive name.

Hab.: Near Dalby, *Dr. T. L. Bancroft* (September, 1913); Chinchilla, *R. C. Beasley* (December, 1914).

### Order RUBIACEÆ.

GALIUM, Linn.

**G. tricorne,** *With.* Annual, glabrous, stems simple or slightly branched at the base, ascending, very scabrous. Leaves 6-8-verticillate, lanceolate-linear, mucronate, scabrous. Peduncles shorter than the leaves with 1, 2, or 3 flowers, the pedicels of which are rolled back and thickened after flowering. Fruit covered with small tubercles.

Hab.: A native of Europe. I have recently received specimens naturalised near Brisbane from *Mr. Jas. Keys.*

### Order PRIMULACEÆ.

ANAGALLIS, Linn.

**A. parviflora,** *Hoffm.*, gg, and *Link.* Very similar to the common Pimpernel (*A. arvensis*). Annual, glabrous, slightly branched, stems ascending. Leaves opposite, sub-rotund, enlarged and embrassing the stem at the base, obscurely nerved. Flowers blue or pink on peduncles 2-3 times longer than the leaves. Calyx lobes lanceolate acuminate; corolla small, equalling or slightly exceeding the calyx, lobes oval. Capsule globose, not exceeding the calyx.

Hab.: A native of the Mediterranean region, naturalised near Brisbane, *Colonel C. F. Plant.*

### Order SCROPHULARINEÆ.

HERPESTIS, Gaertn. f.

**H. chamædryoides,** *Kunth.* (Plate 1.) A procumbent branching glabrous herb. Branches slender, diffuse, tetragonous, often rooting. Leaves opposite, shortly petiolate, ovate or obovate-oblong, obtuse, crenate, base cuneate, entire, 3-9 lines long, 2-6 lines broad. Pedicels

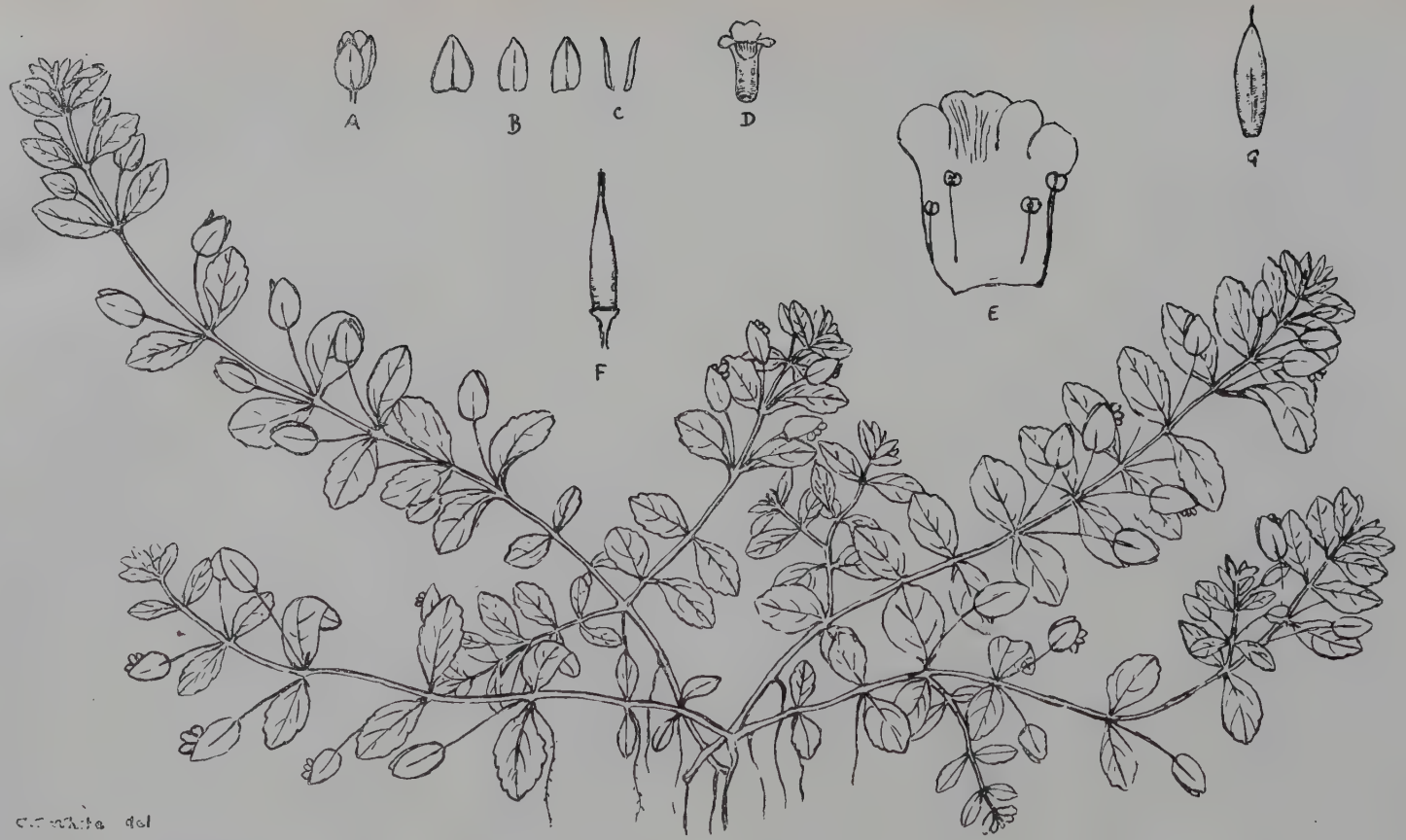


PLATE 1.—HERPESTIS CHAMÆDRYOIDES, *Kunth.*

A—Flower. B—Outer calyx lobes. C—Inner calyx lobes. D—Corolla E—Corolla laid open. F—Pistil. G—Fruit
A D—Natural size. E G—Enlarged.

axillary, solitary, often opposite, erecto-patent, filiform, ebracteate. Calyx 5-partite, 3 outer segments ovate oblong, the 2 inner ones linear lanceolate. 3-5 lines long. Corolla yellow, very slightly longer than the calyx, upper lip emarginate, lower trifid. Stamens short, included. Style short. Capsule, ovate, acute. Seeds numerous, very minute.

Hab.: A native of Tropical America. Specimens have been received as naturalised near Cairns from *Mr. C. E. Wood.*

This plant is met with as a naturalised weed in the ricefields of Java; it is also said to be a not uncommon weed in the West Indian canefields.

### Order PLANTAGINEÆ.

PLANTAGO, Linn.

**P. major,** *Linn.* var. **Cornuti,** *Gouan.* (as a species). This differs from the common form in its much larger size. A perennial one to over 2 ft. high. Leaves oval or elliptic, 7-9 nerved, attenuated at the base into a very long petiole. Scapes much longer than the leaves.

Hab.: A native of the Mediterranean region; now a naturalised weed on some of the farms in the Pine River district. Specimens received from *E. W. Bick.*

### Order URTICACEÆ.

FICUS, Linn.

**F. scandens,** *Roxb.* I have just recently received specimens of this from Samarai, British New Guinea, from Mr. Thos. J. A. Thomson, who states: "I have seen two remarkable cures of big sores on boys' feet with this after trying all our medicines; the natives simply break the fruit off, then drop on the sore the white milk that exudes from the fruit." The specimens forwarded seem to agree better with the normal form than with the Australian variety.

### Order FUNGI.

**Boletus portentosus,** *Berk. et Br.*

Hab.: At the base of a tree, Goodna, *C. T. White.*

**Ustilago utriculosa,** *Tul.*

Hab.: On inflorescence of *Polygonum attenuatum,* Ithaca Creek, *C. T. White.*

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## A MARKET FOR MAIDEN-HAIR FRONDS.

The Colonial Botanist has recently received the following letter from Messrs. Gordon and Gotch, 15 St. Bride street, London, E.C., England:—

"Dear Sir,—A friend of ours is of the opinion that there should be an opening for considerable business in the shipment of dried Maiden-hair Ferns from Australia to London.

"We have failed to secure any information on the matter over here, so venture to think that you in your official capacity may be able to assist us by passing this enquiry into likely hands. Our friends would doubtless be able to purchase in large quantities, and we would suggest for preliminary purposes that quotation be sent per 1,000 leaves made up in fifties, the quotation being for say 5,000, 10,000, and 20,000.—Yours faithfully, "(Sgd.) GORDON AND GOTCH."

I should think that *Adiantum formosum* is the one that would prove the most suitable for the purpose; this is the common large Maiden-hair of our Southern and Northern scrubs and the quantities referred to could often soon be gathered.

# Entomology.

## BEETLE BORERS OF SUGAR-CANE.

By E. JARVIS, Assistant Government Entomologist.

The following article upon "Beetle-borers of Sugar-cane from New Guinea" has been received by the General Superintendent of the Bureau of Sugar Experiment Stations:—

It is thought that the following notes may prove serviceable to those interested in the welfare of our sugar industry, and more particularly to entomologists who are endeavouring to minimise financial losses occasioned by the injurious action of various insect pests of cane.

The beetle-borers in question were found by the writer last September at Macnade in two varieties of sugar-cane:—

### *CRYPTORHYNCHUS* Sp.

Injuries due to this weevil are somewhat similar in general appearance to those caused by our common beetle-borer (*Rhabdocnemis obscurus*), but the tunnels seldom exceed 4 in. in length, are very irregular in width, and may entirely encompass an affected internode, thus destroying most of the internal portion. The larva does not construct a cocoon, but pupates at the end of its tunnel in an egg-shaped chamber, one end of which consists of débris tightly compacted, the whole interior being neatly smoothed and rounded.

LARVA.—The larva is a light-yellow, wrinkled, soft-bodied grub about a quarter of an inch long with bright chestnut-red head, and black mandibles.

PUPA.—Pale creamy-yellow, with dark brown eyes and two reddish black-pointed spines at the extremity of the abdomen. Length, about $\frac{5}{16}$ of an inch.

ADULT.—The perfect insect is a somewhat narrow-bodied weevil, scarcely a quarter of an inch long and of a general dark yellowish-brown colour, with a small orange-yellow blotch on each side close to the legs, which is brighter in some specimens, but fades after death to dull brownish-yellow.

Freshly emerged adults are often reddish at first, but gradually darken to the normal colour upon continued exposure to light.

Like other species of the genus, this bettle cannot fly, though able to walk quickly, and has the curious habit of feigning death when alarmed. At such times it lies motionless on its side with legs bunched together in a shapeless mass, and if chancing to fall upon ploughed ground or among weeds, its extraordinary resemblance to surrounding particles of soil, &c., enable it to easily elude observation.

Cryptorhynchus weevils are noted for possessing remarkable tenacity of life, and it may be of interest to mention that I subjected this species to strong fumes of cyanide of potassium for twenty-four hours in a tightly corked bottle, and next day found the bettle alive and able to move its legs. It did not fully recover from the effects, however, and died a few days later.

### *RHABDOCNEMIS* Sp.

This weevil might at first sight pass for an abnormally small specimen of our common beetle-borer, but is a more slender insect, and when looked at closely the thorax and base of beak appear velvety and of a dark olive-brown tint, while the wing-covers instead of being black are deep brown, more or less reddish on the basal portion. Length, scarcely $\frac{3}{8}$ of an inch.

It was found boring cane, the damage inflicted being very similar to that caused by *R. obscurus*. No larvæ or pupæ were observed, and only one adult (a female).

NOTE.—Scientific descriptions of these beetle-borers are reserved for publication elsewhere.

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF NOVEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING NOVEMBER, 1913 AND 1914, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|
| | Nov. | No. of Years' Records. | Nov., 1914. | Nov., 1913. |
| *North Coast.* | In. | | In. | In. |
| Atherton ... ... | 2·01 | 13 | 0·75 | 1·21 |
| Cairns ... ... | 4·06 | 27 | 3·48 | Nil |
| Cardwell ... ... | 4·65 | 27 | 2·17 | Nil |
| Cooktown ... ... | 3·13 | 27 | 2·81 | Nil |
| Herberton ... ... | 2·59 | 27 | 0·61 | 2·04 |
| Ingham ... ... | 4·09 | 22 | 1·62 | Nil |
| Innisfail ... ... | 6·98 | 27 | 4·24 | Nil |
| Mossman ... ... | 6·12 | 5 | 5·30 | 0·25 |
| Townsville ... ... | 1·89 | 30 | 0·13 | 0·01 |
| *Central Coast.* | | | | |
| Ayr ... ... ... | 1·45 | 27 | Nil | Nil |
| Bowen ... ... | 1·29 | 27 | 1·06 | 0·01 |
| Charters Towers ... | 1·57 | 27 | Nil | 0·02 |
| Mackay ... ... | 2·45 | 27 | 1·10 | 0·07 |
| Proserpine ... ... | 3·47 | 11 | 1·36 | 0·06 |
| St. Lawrence ... | 2·12 | 27 | 0·27 | 2·25 |
| *South Coast.* | | | | |
| Crohamburst ... | 4·47 | 20 | 3·30 | 0·31 |
| Biggenden ... ... | 2·45 | 14 | 1·31 | 1·06 |
| Bundaberg ... ... | 2·39 | 27 | 0·53 | 1·83 |
| Brisbane ... ... | 3·57 | 63 | 0·59 | 1·64 |
| Childers ... ... | 2·75 | 19 | 0·53 | 3·75 |
| Esk ... ... ... | 3·02 | 27 | 0·75 | 1·28 |
| Gayndah ... ... | 2·54 | 27 | 0·96 | 0·93 |
| Gympie ... ... | 2·88 | 27 | 1·68 | 0·71 |
| Glasshouse M'tains | 3·97 | 6 | 1·95 | 1·67 |
| Kilkivan ... ... | 2·50 | 27 | 0·12 | 0·68 |
| Maryborough ... | 2·80 | 27 | 0·54 | 2·82 |

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|
| | Nov. | No. of Years' Records. | Nov., 1914. | Nov., 1913. |
| *South Coast*—continued: | In. | | In. | In. |
| Mount Larcom ... | ... | ... | 0·54 | 2·82 |
| Nanango ... ... | 2·35 | 27 | 0·48 | 0·48 |
| Rockhampton ... | 2·12 | 27 | 0·68 | 0·70 |
| Woodford ... ... | 2·98 | 27 | 1·52 | 1·03 |
| Yandina ... ... | 3·50 | 21 | 1·67 | 1·17 |
| *Darling Downs.* | | | | |
| Dalby ... ... | 2·47 | 27 | 0·65 | 0·47 |
| Emu Vale ... ... | 2·72 | 17 | 0·56 | 0·81 |
| Jimbour ... ... | 2·47 | 24 | 0·54 | Nil |
| Miles ... ... | 2·35 | 27 | 1·31 | Nil |
| Stanthorpe ... | 2·75 | 27 | 2·13 | 0·61 |
| Toowoomba ... | 3·06 | 27 | 0·75 | 0·90 |
| Warwick ... ... | 2·61 | 27 | 1·05 | 0·65 |
| *Maranoa.* | | | | |
| Roma ... ... | 2·13 | 25 | 1·36 | 0·54 |
| *State Farms, &c.* | | | | |
| Gatton College ... | 2·71 | 14 | 0·88 | 0·42 |
| Gindie ... ... | 2·06 | 13 | Nil | 1·12 |
| Kamerunga Nurs'y | 3·22 | 23 | 2·68 | 0·01 |
| Kairi ... ... | ... | ... | 0·17 | 1·55 |
| Sugar Experiment Station, Mackay | 2·50 | 16 | ... | 0·06 |
| Bungeworgorai ... | ... | ... | ... | 0·03 |
| Warren ... ... | ... | ... | Nil | 0·70 |
| Hermitage ... | 2·81 | 7 | 1·20 | 0·64 |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for November this year and for the same period of 1913, having been compiled from telegraphic reports, are subject to revision.

# General Notes.

## BANANAS AS FOOD.

There are many methods of preparing the banana as food besides the usual way of eating it as a ripe fruit. W. Fowcett, B.Sc., late director of public gardens and plantations in Jamaica, in his valuable book on "The Banana—its Cultivation, Distribution, and Commercial Uses," gives much information on the methods of utilising the fruit and on the by-products obtainable from it. He first mentions the roasting of bananas on the grill, stewing them as is done with pears, making banana fritters, &c. Then the processes of preserving the fruit in the same manner as figs, raisins, and other dried fruits are produced are described. Banana flour from the fully-grown unripe banana, he mentions as a regular article of consumption in and export from the West Indies. It is shown that in all the banana-exporting countries put together there are probably as many as 8,000,000 bunches which fail to come up to the standard demanded by shippers and the trade. Then it was found that the small unsaleable fruit could be utilised in making alcohol, and, to some extent, this has been turned to some account.

Mr. A. F. Spawn, of Tampa, Florida, who resided for some years in Queensland and Victoria, manufactured banana figs and banana flour in 1887. He did not make either wine or spirits from the fruit, but a very much better product in the shape of banana coffee. This is a product which, considering the high opinion held of it both in America, Great Britain, and Australia, we are surprised has not been more largely exploited. The Mortimer Pure Food Company, Chicago, considered Mr. Spawn's banana coffee to be an article of the higher order of food, and destined to do more good for the coffee-drinking nations than any other food, it being a pure article and a most delicious beverage. The "Home Journal," New York, wrote:—"The transformation of the most nutritious of fruits in the world into a coffee is a great triumph. It is a perfect drink, and solves the coffee question . . . it is a satisfying beverage, supplying an aroma and taste heretofore lacking in all coffee substitutes."

In 1913, Mr. Spawn sent to the Department of Agriculture and Stock some tubers of the "Dasheen" from which he also prepares a good food. These were distributed to the Botanic Gardens and the Kamerunga State Nursery, where they were acclimatised. Under the name of "Tania," we described the tuber in the November issue of the Journal for 1906.

But, to return to the products of the banana, practically only a small proportion of the world's banana production can be utilised for the manufacture of flour and banana figs, and it remains to consider the use of the fruit in manufacturing an alcoholic spirit. Ligon, in his

"History of Barbados" (1657), says that the bananas for this purpose are gathered when fully ripe, then peeled, and washed in water well boiled. The mash is left overnight, when it is strained and the liquor bottled. In a week it is ready for use. It is a very strong and pleasant drink, but must be used sparingly, for it is much stronger than "sack" (sherry), and is apt to mount to the head.

The possibility of utilising the banana fruit in the production of alcohol has been more than once under the consideration of the Academy of Sciences of France, and Mr. Fawcett takes the following information from a paper read before the Academy by M. B. Corenwinder ("Comptes Readers," vol. 88, 293, 1879):—"It had already been shown by Buignet that during the whole growth of this fruit the saccharine matter is constituted entirely of cane sugar, but the proportion varies considerably. From results of analyses by Corenwinder himself, it appears that a sound ripe banana fruit contains as much as 22 per cent. of its weight of sugar, 16 per cent. being crystallisable, and the remainder uncrystallisable. In the mature sugar-cane, the proportion of cane sugar present is, according to Payen, 18 per cent."

In 1894 experiments on a large scale were carried out by Herr Kahlke, at his manufactory of yeast and alcohol at Königsberg, on the use of banana meal in brewing. Herr Kahlke wrote in the weekly paper "Alcohol" as follows:—

"Banana flour, without doubt, from its richness in starch and its good flavour, is particularly suitable for the manufacture of yeast. This flour is easily rendered saccharine. It has all the requisite properties of an excellent class of yeast, and, moreover, keeps well. The alcohol obtained from it leaves nothing to be desired. . . . Satisfactory experiments have also been made in some breweries, where 20 per cent. of malt has been replaced by the flakes and flour of bananas. The flavour of beer was not altered, and the quantity of liquid was increased, and the malt was replaced by a less expensive substance."

We have already, in previous issues of the Journal, given several recipes for the various methods of utilising bananas in the home, and have shown that a valuable fibre can be obtained from the banana, known as *Musa textilis*.

## TO FIND THE CONTENTS OF STACKS.

A knowledge of the weight of hay in a stack is useful in several ways to a farmer—for fire insurance, for instance. It is no uncommon occurrence for one or more stacks to be destroyed by fire either accidentally or wilfully caused. For a very small premium stacks may be insured against fire; and to get at the weight of the contents as nearly as possible is important, in order that the value may neither be over nor under estimated.

Various modes may be adopted, but the only accurate one is by the use of platform scales. The number of tons may be nearly determined

by ascertaining the number of cubic feet or yards in the rick, and obtaining the weight per cubic foot by actual weighing.

| Weight per Foot. | | Yards to a Ton. | Weight per Foot. | | Yards to a Ton. |
|---|---|---|---|---|---|
| Lb. Oz. | | | Lb. Oz. | | |
| 5 3 | = | 16 | 7 8 | = | 11 |
| 5 8½ | = | 15 | 8 4 | = | 10 |
| 6 0 | = | 14 | 9 3 | = | 9 |
| 6 6 | = | 13 | 10 5 | = | 8 |
| 6 14 | = | 12 | | | |

The number of yards per ton will depend on the solidity of settlement of the stack. If a good-sized stack has well settled, about 12 cubic yards to a ton will be fair.

The following rule will give the weight approximately by measurement:—

With a tape measure, measure the length and breadth of the stack, then the height to the eaves, and lastly the perpendicular height from the eaves to the top.

To calculate the quantity proceed thus—

To the height from the ground to the eaves, add one-third of the height from the eaves to the top; multiply this sum by the breadth and that product by the length. This will give the content in cubic feet, which divided by 27 (the number of cubic feet in a yard) the quotient will be in yards. Divide this by 10 to bring it into tons.

EXAMPLE.

Suppose a stack of hay, 30 ft. in length; 20 ft. in breadth; the height from ground to eaves, 14 ft.; and height from the eaves to the top, 9 ft.—

| | | | |
|---|---|---|---|
| 14 feet | = | height to the eaves | } add |
| 3 | = | ⅓ of height to top | } |
| 17 | | | |
| 20 | = | breadth | |
| 340 | | | |
| 30 | = | length | |
| 10,200 | = | cubic feet | |

27)10,200(377·7 cubic yards.
10)377·7(37·7 tons, or 14 cwt.

As the sides of stacks are generally bevelled inwards, in measuring for length and breadth take the *mean* rule—that is, measure at half-way up from ground to eaves; and for heights measure perpendicularly.

If the hay is not well settled, divide by 9.

If well settled, divide by 7.

If very compact, divide by 6.

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ERRATUM.

In the December issue of the Journal an error occurred in the quantity of methylated spirit in making up a blister for the removal of a splint from a horse. Instead of 1 drachm, the quantity should have been given as 1 oz.

PLATE 2 (FIG. 1).—Large Papayas developed after thinning out the remainder.

(FIG. 2).—Papaya Tree artificially caused to branch.

# Answers to Correspondents.

## MANURE FOR CITRUS TREES.

E.M., Auckland, N.Z.

A standard manure for citrus trees should contain not less than 80 lb. nitrogen, 40 lb. phosphoric acid, and 80 lb. potash per acre.

The 80 lb. nitrogen can be obtained approximately from 600 lb. dried blood, or 400 lb. sulphate of ammonia, or can be supplied by green manuring.

The 40 lb. phosphoric acid can be obtained approximately from 235 lb. of 37 per cent. soluble superphosphate, or Thomas' phosphate, 200 lb. of meatworks fertiliser without blood, or 165 lb. good bonedust.

The 80 lb. of potash is obtained from 160 lb. of 96 per cent. sulphate of potash.

This combination gives a complete manure, containing 8 per cent. nitrogen, 4 per cent. phosphoric acid, and 8 per cent. potash. For young trees not in bearing, a smaller quantity should be used. Trees 5 years old require from 4 to 6 lb. of the complete manure per tree. Old trees in full bearing require as much as 20 lb. per tree. The manure should be given in two applications—the first in July or August, and the second in December or January.

## AREA OF CLEARED LAND.

G.C.P., Bunerba—

The correct area of clearing a block in triangular form, with sides 14, 15, and 19 chains respectively, is 10·40 acres, as calculated by the following rule:—

Add the three sides together, and take half that sum, then multiply the half sum and the three remainders together; and the square root of the last product will give the area.

*Example.*—$19 + 15 + 14 = \frac{48}{2} = 24$

$24 - 19 = 5$

$24 - 15 = 9$

$24 - 14 = 10$

$24 \times 5 = 120 \times 9 = 1080 \times 10 = 10800$, the square root of which is 10·40 acres.

# TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

| Date. | JANUARY. | | FEBRUARY. | | MARCH. | | APRIL. | |
|---|---|---|---|---|---|---|---|---|
| | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 4·57 | 6·45 | 5·22 | 6·42 | 5·41 | 6·20 | 5·58 | 5·46 |
| 2 | 4·57 | 6·45 | 5 22 | 6·42 | 5 42 | 6·19 | 5·58 | 5·45 |
| 3 | 4·58 | 6·46 | 5·23 | 6·41 | 5·43 | 6·18 | 5·59 | 5·44 |
| 4 | 4 58 | 6·46 | 5·23 | 6·41 | 5·44 | 6·17 | 5·59 | 5·43 |
| 5 | 4·59 | 6·47 | 5·24 | 6·40 | 5·45 | 6·15 | 6·0 | 5·42 |
| 6 | 4·59 | 6·47 | 5·24 | 6·40 | 5·45 | 6 14 | 6·0 | 5·41 |
| 7 | 5 0 | 6·47 | 5·25 | 6·39 | 5·45 | 6·13 | 6·1 | 5·40 |
| 8 | 5·1 | 6·47 | 5·26 | 6·38 | 5·46 | 6·12 | 6·1 | 5·39 |
| 9 | 5·2 | 6·47 | 5·27 | 6·37 | 5·46 | 6·11 | 6·2 | 5 38 |
| 10 | 5·3 | 6·47 | 5·28 | 6·36 | 5·47 | 6·10 | 6·2 | 5·37 |
| 11 | 5·3 | 6·47 | 5·29 | 6 36 | 5·47 | 6·9 | 6·3 | 5·36 |
| 12 | 5·4 | 6·47 | 5·30 | 6·35 | 5·48 | 6·8 | 6 4 | 5·34 |
| 13 | 5·5 | 6·47 | 5·30 | 6·34 | 5·48 | 6·7 | 6·4 | 5·34 |
| 14 | 5·6 | 6·47 | 5·31 | 6·34 | 5·49 | 6·6 | 6·4 | 5·33 |
| 15 | 5·7 | 6·47 | 5·32 | 6·33 | 5·49 | 6·5 | 6·5 | 5·32 |
| 16 | 5 8 | 6·47 | 5·33 | 6·32 | 5·50 | 6·4 | 6·5 | 5·31 |
| 17 | 5 9 | 6·47 | 5·34 | 6·31 | 5·50 | 6·3 | 6·6 | 5·30 |
| 18 | 5·10 | 6·47 | 5·34 | 6·30 | 5·51 | 6·2 | 6·6 | 5·29 |
| 19 | 5·11 | 6·46 | 5·35 | 6·29 | 5·52 | 6·0 | 6·7 | 5·28 |
| 20 | 5·12 | 6·46 | 5·36 | 6·28 | 5·53 | 5·59 | 6·8 | 5·27 |
| 21 | 5·12 | 6·46 | 5·36 | 6·28 | 5·53 | 5·58 | 6 8 | 5·26 |
| 22 | 5·13 | 6·45 | 5·37 | 6·27 | 5·53 | 5·57 | 6·9 | 5·25 |
| 23 | 5·14 | 6·45 | 5 37 | 6·26 | 5·54 | 5·56 | 6·9 | 5·24 |
| 24 | 5·15 | 6·45 | 5·37 | 6·25 | 5·54 | 5·55 | 6·10 | 5·23 |
| 25 | 5·16 | 6·44 | 5·38 | 6·24 | 5 54 | 5·54 | 6·10 | 5 22 |
| 26 | 5·16 | 6·44 | 5·38 | 6·23 | 5·55 | 5·53 | 6·11 | 5·21 |
| 27 | 5·17 | 6·44 | 5·39 | 6 22 | 5·55 | 5 52 | 6·11 | 5·20 |
| 28 | 5·18 | 6·44 | 5·40 | 6·21 | 5·56 | 5·51 | 6·12 | 5 20 |
| 29 | 5·19 | 6·43 | ... | ... | 5·56 | 5·50 | 6·12 | 5·19 |
| 30 | 5 20 | 6·43 | ... | ... | 5·57 | 5·49 | 6·13 | 5·18 |
| 31 | 5·21 | 6·43 | ... | ... | 5·58 | 5·48 | ... | ... |

## PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 1 Jan. | ○ | Full Moon | 10 | 20 | p.m. |
| 9 „ | ☽ | Last Quarter | 7 | 12 | a.m. |
| 16 „ | ● | New Moon | 12 | 41 | „ |
| 23 „ | ☾ | First Quarter | 3 | 32 | p.m. |
| 31 „ | ○ | Full Moon | 2 | 41 | „ |

The moon will be brightest, under favourable atmospheric conditions, when in the last quarter, as it will then be nearer to the earth.

| | | | | | |
|---|---|---|---|---|---|
| 7 Feb. | ☽ | Last Quarter | 3 | 11 | p.m. |
| 14 „ | ● | New Moon | 2 | 31 | „ |
| 22 „ | ☾ | First Quarter | 12 | 58 | „ |

There will be no actual Full Phase this month, two having occurred in January. The moon will be nearest to earth on 7th February at 11·18 p.m.

| | | | | | |
|---|---|---|---|---|---|
| 2 Mar. | ○ | Full Moon | 4 | 32 | a.m. |
| 8 „ | ☽ | Last Quarter | 10 | 27 | p.m. |
| 16 „ | ● | New Moon | 5 | 42 | a.m. |
| 24 „ | ☾ | First Quarter | 8 | 48 | „ |
| 31 „ | ○ | Full Moon | 3 | 38 | p.m. |

The moon will be nearest the earth on the 5th at 1 p.m., and farthest from the earth on the 21st at 11·12 a.m. The moon's distance from the earth at these times will be about 225,000 miles, and about 252,000 miles, respectively.

| | | | | | |
|---|---|---|---|---|---|
| 7 Apr. | ☽ | Last Quarter | 6 | 12 | a.m. |
| 14 „ | ● | New Moon | 9 | 36 | p.m. |
| 23 „ | ☾ | First Quarter | 1 | 39 | a.m. |
| 30 „ | ○ | Full Moon | 12 | 19 | „ |

The moon will be in perigee, or nearest to the earth, on the 2nd at 9·36 a.m., and on the 30th at 5·12 p.m. It will be in apogee, or farthest from the earth, on the 18th at 1 36 a.m.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR DECEMBER, 1914.

| Article. | | DECEMBER. |
|---|---|---|
| | | Prices. |
| Bacon | lb. | 8d. to 10d. |
| Bran | ton | £9 |
| Butter | cwt. | 110s. |
| Chaff, Mixed | ton | £5 |
| Chaff, Oaten | „ | £4 to £7 10s. |
| Chaff, Lucerne | „ | £3 to £4 10s. |
| Chaff, Wheaten | „ | £4 to £5 |
| Cheese | lb. | 5d. to 7d. |
| Flour | ton | ... |
| Hams | lb. | 1s. 2d. to 1s. 3d. |
| Hay, Oaten | ton | £2 15s. to £3 |
| Hay, Lucerne (Prime) | „ | £3 15s. |
| Honey | lb. | 2d. to 3d. |
| Maize | bush. | 3s. 4d. |
| Oats | „ | 3s. 8d. |
| Onions | ton | £6 15s. to £8 |
| Peanuts | lb. | 3½d. |
| Pollard | ton | £8 10s. |
| Potatoes | „ | £4 to £7 10s. |
| Potatoes (Sweet) | cwt. | 2s. 3d. |
| Pumpkins | ton | £2 to £3 10s. |
| Wheat, Milling | bush. | 5s. 4d. |
| Eggs | doz. | 9d. to 1s. 3½d. |
| Fowls | pair | 3s. to 5s. |
| Geese | „ | 4s. 9d. to 5s. 9d. |
| Ducks, English | „ | 3s. 6d. to 4s. |
| Ducks, Muscovy | „ | 4s. to 5s. 6d. |
| Turkeys (Hens) | „ | 8s. 6d. to 12s. 6d. |
| Turkeys (Gobblers) | „ | 14s. to 19s. |

## SOUTHERN FRUIT MARKETS.

| Article. | DECEMBER. |
|---|---|
| | Prices. |
| Bananas (Queensland), per case | 12s. to 14s. |
| Bananas (Queensland), per bunch | ... |
| Bananas (Fiji), per case | 24s. to 24s. 6d. |
| Bananas (Fiji), per bunch | ... |
| Mandarins (Queensland), per case | ... |
| Mangoes, per case | 8s. to 11s. |
| Oranges (Navel), per case | 12s. to 16s. |
| Oranges (Seville), per case | 6s. to 7s. |
| Oranges (Valencias), per case | 12s. to 20s. |
| Oranges (other), per case | ... |
| Passion Fruit (Queensland), per half-case | 5s. to 9s. |
| Papaw Apples, per half-case | 7s. to 12s. |
| Pineapples (Queens), per case | 9s. to 11s. |
| Pineapples (Ripleys), per case | 6s. to 14s. |
| Pineapples (Common), per case | 8s. to 12s. |
| Tomatoes, per quarter-case | 3s. to 5s. |
| Rockmelons, per double case | 8s. to 10s. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | DECEMBER. Prices. |
|---|---|
| Apples (American), Eating, per case | 20s. to 21s. |
| Apples (Tasmanian), per case | 12s. to 14s. |
| Apples Cooking, per case | 10s. to 12s. |
| Apricots, per quarter-case | 5s. to 6s. 6d. |
| Bananas (Cavendish), per dozen | 2d. to 4d. |
| Bananas (Sugar), per dozen | 1½d. to 2½d. |
| Cape Gooseberries, per quarter-case | 4s. to 7s. |
| Cherries, per quarter-case | 4s. to 9s. |
| Cocoanuts, per sack | 12s. to 15s. |
| Cumquats, per case | ... |
| Custard Apples, per quarter-case | ... |
| Lemons, per case | 10s. to 12s. 6d. |
| Lemons (Italian), per case | 12s. to 15s. |
| Limes, per case | ... |
| Mandarins, per case | 6s. to 8s. 6d. |
| Mangoes, per case | 4s. to 6s. |
| Oranges (Navel), per case | 8s. to 12s. |
| Oranges (other), per case | 2s. to 4s. |
| Papaw Apples, per quarter-case | 1s. 6d. to 4s. |
| Passion Fruit, per quarter-case | 3s. to 5s. |
| Peaches, per quarter-case | 1s. to 3s. 6d. |
| Peanuts, per pound | 3d. |
| Pears, per quarter-case | ... |
| Persimmons, per quarter-case | ... |
| Pineapples (Ripley), per dozen | 5s. to 8s. |
| Pineapples (Rough), per dozen | 3s. 6d. to 5s. 6d. |
| Pineapples (Smooth), per dozen | 6s. to 8s. 6d. |
| Plums, per quarter-case | 2s. to 3s. 6d. |
| Rockmelons, per dozen | 2s. 6d. to 6s. 6d. |
| Rosellas, per sugar bag | ... |
| Strawberries, per tray | ... |
| Strawberries, per dozen boxes | 2s. to 3s. |
| Tomatoes, per quarter-case | 1s. to 4s. |
| Watermelons, per dozen | 4s. to 14s. |

## TOP PRICES, ENOGGERA YARDS, NOVEMBER, 1914.

| Animal. | NOVEMBER. Prices. |
|---|---|
| Bullocks | £15 10s. to £17 |
| Cows | £10 2s. 6d. to £12 15s. |
| Merino Wethers | 20s. |
| Crossbred Wethers | 17s. 9d. |
| Merino Ewes | 16s. |
| Crossbred Ewes | 18s. 6d. |
| Lambs | 18s. 9d. |
| Pigs (Porkers) | 35s. |

# Farm and Garden Notes for February.

FIELD.—The land intended for potatoes should now be ready for planting. Plant sound small potatoes, well shot, without cutting them. If large potatoes are cut into setts, there is a risk of their rotting, as the usual wet weather may be expected, with a hot, muggy atmosphere. Weeds will be very troublesome, and for that reason the sowing of lucerne should be deferred till later. Sow lucerne in deep rich soil, thoroughly worked and deeply ploughed. Cape barley, panicum, kafir corn, imphee, sorghum, and vetches may be sown; but it is risky to plant maize for a late crop, as early frosts would destroy the ripening grain. For an early winter crop, sow swede turnips and mangelwurtzels.

KITCHEN GARDEN.—Make preparations for good crops of vegetables for the early winter by ploughing or digging all unoccupied land, supplying well-rotted manure if needed. Chicken guano is also an excellent fertiliser, if prepared as follows:—

Spread a layer of black soil on the ground. Dump the fowl manure on to this, and pound it fine with the back of a spade; add hardwood ashes, so that the compound shall contain—Soil, 3 bushels; fowl manure, 2 bushels; ashes, 1 bushel. Mix thoroughly, and a little before planting moisten the heap with water, or, better still, with urine; cover with old mats, and let it lie till needed.

Most market gardeners will have cabbages and cauliflowers ready for transplanting. Do this during the month. In the pamphlet on "Market Gardening" issued by the Department, it is recommended to sow the seed from the middle of January to the middle of March, arranging the time, however, to suit early and late districts. For winter crops, the Drumhead type, of which Flat Dutch and Queensland or Florida Headen are good examples, and are the most profitable. The Savoy cabbage does well here. The best cauliflowers to grow are the Large Asiatic, Eclipse, Early Dwarf, and Le Normand. If the aphis appears, spray with tobacco solution.

Sow French beans, butter beans, beet, carrot, turnip, radish, cabbage, cauliflower, cress, peas. Should the weather prove dry after the January rains, give the plants a good soaking with water. Gather all fruit of cucumbers, melons, French and other beans, and tomatoes as they ripen, to ensure the continued production of the vines and plants.

FLOWER GARDEN.—Thin out and tie up dahlias. Keep the weeds down, and never allow them to seed. Sow hardy annuals. This is the best month for sowing, as you will be able to keep up a succession of bloom during the succeeding months of autumn and winter. To ensure this, sow phlox, pansy, daisy, stocks, aster, nasturtium, hollyhock, candytuft, mignonette, sweet peas, dianthus, carnations, cornflower, summer

chrysanthemum, verbenas, petunias, pentstamons, &c. Dianthus, sown now and planted out in March, will bloom during the whole year, if the dead stalks and blooms are regularly cut away.

Do not sow flower seeds too deep, as on the depth will depend greatly what results you will have as regards the seed germinating. It is easy to remember that seeds should be covered with fine soil to a depth equal to their own size; for instance, a pea is about one-eighth of an inch in diameter, therefore, cover it with one-eighth of an inch of soil.

# Orchard Notes for February.

In order that the series of monthly notes that have appeared for some years past in the "Agricultural Journal" might be rendered of more value to our fruit-growers, I took advantage of the commencement of the new year to revise them and bring them up to date. At the same time, the notes have been somewhat altered, as, instead of making them of a general nature, applicable to the whole of the State, they are, to a certain extent, localised, as, although the general principles of cultivation, manuring, pruning, treatment of fruit pests, as well as of the handling and marketing of the fruit are applicable to the State as a whole, there are many matters that are of interest to individual parts of the State rather than to the whole State; and, further, notes that are applicable to the Southern part of the State for one month are not always applicable to the North for the same month.

In order to carry out this idea the State has been divided as follows:—

1. The Southern Coast Districts, south of the Tropic of Capricorn;
2. The Tropical Coast Districts;
3. The Southern and Central Tablelands.

This plan has met with such general approval during the past year that the notes will henceforth be published in accordance therewith.

## THE SOUTHERN COAST DISTRICTS.

The earlier summer fruits, including grapes, will be pretty well over, but pineapples, mangoes, and bananas are in full fruit. The bulk of the main summer crop of pines ripens during the month, and growers are in consequence kept very busy sending them to both our local markets and canneries, and to the Southern States. The planting of all kinds of tropical fruits can be continued where necessary, though earlier planting

of both pines and bananas is to be recommended. Still, if the land is thoroughly prepared—viz., well and deeply worked—they can be planted with safety, and will become well established before winter. The month is usually a wet one, and both tree and weed growth is excessive. If unable to get on the land with horses to keep down weed growth, use the scythe freely in the orchard before weeds seed, as by doing so you will form a good mulch that will tend to prevent the soil washing, and that when ploughed in later on will add a considerable quantity of organic matter to the soil, thus tending to improve its mechanical condition, its power of absorbing and retaining moisture, as well as to increase its nitrogen contents.

This is the best month of the year in which to bud mangoes in the Brisbane district. The bark of the stock to be budded must run very freely, and the scion, when placed in position, must be tied very firmly. The bark of the scion should be slightly thicker than the bark of the stock, so that the material used to tie it keeps it firmly in its place. As soon as the bud is tied ringbark the stock just above the bud, so as to force the sap of the stock into scion so that a union will take place quickly.

Where cyaniding of citrus and other trees has not been concluded it may be continued during the month, as fruit treated now will probably keep clean and free from scale insects till gathered. If the trees have been treated with Bordeaux mixture, do not cyanide, as cyaniding should always be done previous to spraying with Bordeaux mixture.

If Maori is showing, spray with the sulphide of soda wash. Look out for Black Brand and also for theYellow Peach Moth towards the end of the month in the earlier districts. Spraying with Bordeaux mixture is advisable in the case of both of these pests.

Get land ready for strawberry planting, so as to be ready to set out runners next month. Some growers set out plants as early as the end of February, but March is to be preferred. Citrus and deciduous trees can still be budded during the month. Young trees in nursery should be kept clean and attended to; ties should be cut where necessary, and the young trees trained to a straight single stem.

## THE TROPICAL COAST DISTRICTS.

As the month is usually a very wet one in this part of the State, very little work can be done in the orchard other than keeping down excessive weed growth by means of a scythe. When citrus trees are making excessive growth and throwing out large numbers of water-shoots, the latter should be cut away, otherwise they are apt to rob the rest of the tree, and thus injure it considerably. Many of the citrus trees will come into a second blossoming during the month, and this will produce a crop of fruit ripening towards the end of winter and during the following spring. The main crop, where same has set in spring, will be ripening towards the end of the month, but as a rule insect life of all kinds is so

prevalent at this time of year that the bulk of the fruit is destroyed. Where there is sound fruit, however, it will pay to look after. If the weather is wet it should be artificially dried before packing, but if there are periods of sunshine, then the fruit can be cut and laid out on boards or slabs in the sun, so that the extra moisture of the skin can be dried out. Care will have to be taken not to sun-scald the fruit, or to dry it too much; all that is required is to evaporate the surplus moisture from the skin, so that the fruit will not speck when packed.

Tropical fruits of all sorts can be planted during the month. Budding of mangoes and other fruits can be continued. Bananas must be kept netted, as fly is always bad at this time of year.

## THE SOUTHERN AND CENTRAL TABLELANDS.

The marketing of later varieties of apples, pears, plums, peaches, and nectarines will occupy the attention of the Stanthorpe growers. The grape harvest will also extend right through the month. Every care should be taken to see that the fruit fly and codling moth are not allowed to spread, although the best work in fighting these pests has to be done during the months of December and January, as on the action then taken, if carried out systematically, the freedom of the later fruits from infestation mainly depends.

Handle the fruit carefully, and see that no fly or codling moth infested fruit leaves the district. The grapes, ripening as they do when this fruit is over in the earlier parts of the State, should be sent not only to Brisbane but to all other parts of the State. For long shipment nothing can beat crates holding 6-lb. baskets. The fruit should be gathered some hours before packing, and be placed in the sun, so as to become thoroughly dry, and to allow the stems to become wilted, as this causes the fruit to hang on the bunch much better, and consequently to reach its destination in better order.

If parrots and flying foxes are troublesome, organised shooting parties or poisoning with strychnine are the best means of dealing with those pests.

The crop of grapes will be about over in the Roma and other inland districts. Citrus trees, when infested by Red Scale, should be cyanided. The orchard should be kept well cultivated after every rain, and when there is no rain, but water is available for irrigation, if the soil requires it, the trees should get a good soaking, which, if followed by thorough cultivation, will carry the trees on till the fruit is ripe.

# LIST OF AGRICULTURAL, HORTICULTURAL, AND PASTORAL SOCIETIES AND ASSOCIATIONS IN QUEENSLAND.

Societies and associations desirous of being registered and placed on the above list must make application to that effect, and forward to the Under Secretary for Agriculture and Stock the following particulars:—

Number of members who have paid their subscriptions for 1912.

Number of meetings held by the Society during 1912.

Date of the last meeting.

Name of the Secretary for 1913.

It is equally necessary that prompt notice be given to the Editor of changes in the Secretaryship of any Society or Association, a matter which is much neglected. Furthermore, information concerning dates on which shows are to be held must be forwarded to the Editor at least six weeks before the Show date. If these suggestions are not complied with, the Society whose Secretary neglects to supply the required information will be liable to be struck off the list of Societies published monthly in the Journal.

| Postal Address. | Name of Society. | Name of Secretary | Show Dates | |
|---|---|---|---|---|
| | | | 1914 | 1915. |
| Allora .. | Central Downs Agricultural and Horticultural Association | J. C. Marshall ... | 17 and 18 Feb. | 17 and 18 Feb. |
| Aloomba, *vid* Cairns | Aloomba Farmers' Association ... | Hugh A. Niven ... | | |
| Amberley ... | Amberley Farmers' Progress Association | J. T. Goldsborough | | |
| Atherton ... | Atherton Agricultural, Pastoral, and Industrial Association | H. McKnight ... | | |
| Ayr ... .. | Lower Burdekin Farmers' Association | R. W. Edwards ... | | |
| Ayr ... ... | Lower Burdekin Pastoral, Agricultural, and Industrial Association | C. G. M. Boyce ... | 11 and 12 June | |
| Bajool ... | Bajool and Ulam Farmers' Progress Association | A. T. Mitchell ... | | |
| Ban Ban, *vid* Byrnestown | Dundar Branch of the Queensland Farmers' Union | Geo. Gwynne ... | | |
| Barcaldine ... | Barcaldine Pastoral Agricultural and Horticultural Association | W. J. P. Chambers | | |
| Beaudesert .. | Logan and Albert Agricultural and Pastoral Society | M. Selwyn Smith | 12 and 13 May | 11 and 12 May |
| Beenleigh ... | Agricultural and Pastoral Society of Southern Queensland | Capt. C. G. Gehrmann | 3 and 4 Sept. | |
| Beenleigh ... | Logan Farmers' and Industrial Association | Wm. G. Winnett ... | | |
| Beerwah ... | Coochin Creek District Agricultural and Progress Association | E. F. Jones ... | | |
| Belli ... | Belli Creek Farmers' Progress Association | W. E. Neumann .. | | |
| Berwen ... | Haughton River Farmers' Association | James Griffith ... | | |
| Biggenden . | Biggenden Agricultural and Pastoral Society | C. J. Stephensen ... | 9 and 10 July | 22 and 23 July |
| Bin Bin, *vid* Gooroolba | Bin Bin Farmers and Settlers' Association | Milo Burke ... | | |
| Blackall ... | Barcoo Pastoral Society ... ... | C. M. Pegler ... | | |
| Blenheim ... | Blenheim and District and Farmers' Progress Association | W. A. Zerner ... | | |
| Blythedale ... | Blythedale Agricultural Progress Association | J. L. Quinn ... | | |
| Boonah ... | Fassifern and Dugandan Agricultural and Pastoral Association | J. McKenzie ... | 20 and 21 May | 19, 20, and 21 May |
| Boowoogum... | Brooyar Farmers' Progress Association | Jas. Cahill ... | | |
| Bowen ... | Bowen Farmers' Association ... ... | H. Reye ... ... | | |
| Bowen ... | Bowen Pastoral, Agricultural and Mining Association | F. Sellars ... ... | 22, 23, and 24 July | |

## AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914. | 1915. |
| Brisbane ... | The Queensland Dairy Herd Book Society | Alfred Gorrie ... | | |
| Brisbane ... | National Agricultural and Industrial Association of Queensland | J. Bain ... ... | 10 to 15 Aug. | 9 to 14 Aug. |
| Brisbane ... | Queensland Chamber of Agricultural Societies | J. Bain ... ... | | |
| Brisbane .. | Horticultural Society of Queensland | F. W. Woodroffe ... | | |
| Bucca, *viâ* Bundaberg | United Farmers' Association ... | J. H. Hendy ... | | |
| Buderim Mountain | Buderim Branch of the Queensland Farmers' Union | Capt. G. Burrows .. | | |
| Bundaberg ... | Bundaberg Agricultural, Pastoral, and Industrial Society | Redmond Bros. ... | 3 and 4 Sept. | 9 and 10 Sept. |
| Bundaberg ... | Canegrowers' Union of Australia (Woongarra Branch) | O. H. Klotz ... | | |
| Bundaberg ... | Woongarra Canegrowers' Association (A.S.P.A. Branch) | G. O. Strathdee ... | | |
| Bunerba, Deeford (*viâ* Westwood) | Bunerba Farmers' Progress Association | H. J. Barnes ... | | |
| *Burrum ... | Burrum District Farmers' and Fruitgrowers' Association | S. E. Tooth ... | | |
| Byrnestown... | Byrnestown Farmers and Dairymen's Progress Association | Geo. H. Bomford ... | | |
| Caboolture ... | Caboolture Pastoral, Agricultural, and Industrial Society | W. Heming ... | 1 May | |
| Cairns .. | Cairns Agricultural, Pastoral, and Mining Association | H. McMahon ... | | |
| Cairns ... | Cairns Horticultural Society .. | R. Tweedie ... | | |
| Canaga ... | Canaga Farmers' Progress Association | S. H. Wheildon ... | | |
| Cedar Pocket, Gympie | Cedar Pocket Farmers' Association... | W. A. Fraser ... | | |
| Charleville ... | Central Warrego Pastoral and Agricultural Association | T. C. Fallis ... | 4 and 5 May | 4 and 5 May |
| Charters Towers | Charters Towers Pastoral, Agricultural, and Mining Association | A. H. Pritchard ... | 1 and 2 July | |
| Charters Towers | The Towers Horticultural Society ... | Jas. H. Chappel ... | 19 and 20 August | |
| Chatsworth ... | Chatsworth Combined Farmers' Association | F. W. Johns ... | | |
| Chatsworth ... | Chatsworth Farmers' Progress Association | W. Allen ... ... | | |
| Childers ... | Childers Pastoral, Agricultural, and Industrial Society | J. G. Wrench ... | 18 and 19 June | 10 and 11 June |
| Childers ... | Doolbi Canegrowers' Association ... | R. S. Rankin ... | | |
| Chinchilla ... | Pelican Farmers and Settlers' Association | H. K. Nevell ... | | |
| Chinchilla ... | Canaga Farmers' Progress Association | G. J. Rochester ... | | |
| Chinchilla ... | Chinchilla Agricultural and Pastoral Association | R. F. Mackie ... | 14 and 15 April | 6 and 7 April |
| Clermont ... | Peak Downs Pastoral, Agricultural, and Horticultural Society | A. S. Narracott ... | 23 and 24 June | |
| Clifton ... | Darling Downs Pastoral, Agricultural, and Industrial Association | S. C. Mott... ... | 30 Sept. and 1 Oct. | |
| Coochin ... | Coochin Farmers' Progress Association | W. Watson ... | | |
| Cooktown ... | Cooktown District Pastoral, Agricultural, Mining, and Industrial Association | E. A. S. Olive ... | 1 and 2 July | |
| Cooroy ... | Cooroy West Farmers' Progress Association | O. M. Proll ... | | |
| Cooroy ... | Mount Cooroy Progress and Farmers' Association | L. H. Baldwin ... | | |
| Coulsen ... | Coulsen Farmers' Progress Association | Gustav A. Lewald | | |
| Coulstoun, *viâ* Biggenden | Coulston Lakes Branch of the Queensland Farmers' Union | P. E. Britnell ... | | |
| Crow's Nest | Crow's Nest Agricultural, Horticultural, and Industrial Society | James Gleeson ... | 28 and 29 April | 6 and 7 April |
| Dalby ... | Northern Downs Pastoral and Agricultural Association | W. R. Hunter ... | 26 and 27 May | |

* Monthly meetings held alternately at Burrum and Howard.

## AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914. | 1915. |
| Dallarnil ... | Dallarnil Farmers and Dairymen's Association | H. J. Piper ... | | |
| Didcot ... | Didcot Farmers and Settlers' Association | Fred. Jones ... | | |
| Deeford, (Dawson Valley) | Dundee Farmers and Settlers' Progress Association | C. G. Young ... | | |
| Degilbo ... | Emu Creek Farmers and Dairymen's Progress Association | E. M. Gittins ... | | |
| Dirran, *viâ* Malanda | Dirran Settlers' Progress Association | Percy G. R. Dutton | | |
| Emerald ... | Emerald Pastoral and Agricultural Society | J. Esmond ... ... | ... | 26 and 27 May |
| Esk ... ... | Esk and Toogoolawah Pastoral, Agricultural, and Industrial Association | A. M. Hurworth ... | 5 and 6 May (at Toogoolawah) | 18 and 19 May |
| Eukey, *viâ* Ballandean | Eukey Farmers and Fruit-growers' Association | H. H. Stanton ... | | |
| Evelyn .. | Millstream Farmers and Settlers' Association | H. R. Gardiner ... | | |
| Fairford ... | Fairford Agricultural and Pastoral Association | H. E. Hollins ... | | |
| Fordsdale, *viâ* Grantham | Fordsdale Farmers' Association ... | W. M. Ridley ... | | |
| Forest Hill ... | Forest Hill Agricultural and Progress Association | J. Stoddart ... | | |
| Gatton ... | Lockyer Agricultural and Industrial Society | W. A. McIlwraith | 1 and 2 July | |
| Gayndah ... | Pastoral, Industrial, Agricultural, and Horticultural Association | M. C. Stephensen... | 9 and 10 June | |
| Gayndah ... | Gleneden Branch of the Queensland Farmers' Union | W. S. Morris ... | | |
| Gayndah ... | Gurgeena Farmers' Progress Association | W. G. Leaver ... | | |
| Gayndah ... | Binjour Farmers' Progressive Association | F. G. Hunter ... | | |
| Gin Gin ... | Currajong and Gin Gin Agricultural, Pastoral, and Industrial Society | Chas. M. Morris ... Ploughing Match | 27 and 28 May | |
| Gladstone ... | Port Curtis Agricultural, Pastoral, and Mining Association | J. T. W. Brown ... | ... | 18 and 19 May |
| Glen Aplin ... | Ballandean Fruitgrowers' Association | W. H. C. Laird ... | | |
| Gooburrum ... | Gooburrum Farmers' and Cane-growers' Association | W. J. Lutin .. | | |
| Goomboorian road *viâ* Gympie) | Ross and Mullin's Creek Farmers' Progress Association | R. E. Kitchen ... | | |
| Goombungee | Goombungee Agricultural, Horticultural and Pastoral Society | J. J. Morgan ... | ... | 24 March |
| Goondiwindi | Comoron-Moorobie Farmers' Progress Association | J. Johnston ... | | |
| Goondiwindi | MacIntyre Pastoral and Agricultural Society | E. T. Drake ... | 29 and 30 April | |
| Gooroolba .. | Gooroolba Farmers and Settlers' Progress Association | H. A. Harrison ... | | |
| Grantham ... | Ma Ma Creek Farmers' Progress Association | A. McKenzie ... | | |
| Gympie ... | Agricultural Mining, and Pastoral Society | T. J. Brundrit ... | 9 and 16 Sept. | |
| Gympie (Goomboorian road) | The Veteran and Scrubby Creek Farmers' Progress Association | H. Langley ... | | |
| Hambledon (Cairns) | Hambledon Cane Farmers' Association | F. C. P. Curlewis | | |
| Hawthorn (Daymar Siding) | Weengallon Farmers and Settlers' Progress Association | Laurence A. Seeger | | |
| Helidon ... | Flagstone Creek Branch of the Queensland Farmers' Union | Fred Tuffrey ... | | |
| Herberton ... | Herberton Mining, Pastoral, and Agricultural Association | Richard Barton ... | 13 and 14 April | 5 and 6 April |

## AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914. | 1915. |
| Hughenden ... | North Western Queensland Pastoral and Agricultural Society | H. P. Blackall ... | 11 and 12 May | 2nd or 3rd week in May |
| Ingham ... | Herbert River Pastoral and Agricultural Association | Walter Blackman | 4 and 5 Sept. | |
| Inglewood ... | Inglewood Agricultural, Pastoral, and Horticultural Society | J. F. Cheshire ... | 19 and 2 March | 24 and 25 March |
| Innisfail ... | Johnstone River Canegrowers and Manufacturers' Association | Ralph Reid ... | | |
| Innisfail ... | Johnstone River Agricultural Society | T. Nesbet ... ... | | |
| Ipswich ... | The Queensland Pastoral and Agricultural Society | G. W. Allen ... | 27 and 28 May | 26 and 27 May |
| Jackson (Western Line) | Parish Woleebee Settlers' Association | S. C. Griffin ... | | |
| Jardine ... | Jardine Farmers' and Fruitgrowers' Association | R. Lemain ... ... | | |
| Juandah ... | Juandah Dairy and Progress Association | R. Bowie ... ... | | |
| Kamma (Cairns) | The Cairns Canegrowers' Association | C. V. Hives ... | | |
| Kenilworth, *viâ* Eumundi | Kenilworth Farmers' Association ... | W. Price ... ... | | |
| Kenmore ... | Brookfield, Pullen Vale, and Moggill Farmers' Association | F. B. Howard ... | | |
| Kilcoy ... | Kilcoy Pastoral, Agricultural, and Industrial Society | W. E. Reason ... | 14 and 15 May | 6 and 7 May |
| Kilkivan ... | Kilkivan Pastoral, Agricultural, and Industrial Association | F. E. Hopkins ... | 2 July | |
| Killarney ... | Killarney Agricultural Society ... | L. W. Wilkinson ... | ... | 24 and 25 Feb. |
| Kingaroy ... | Agricultural, Pastoral, and Industrial Society | H. Mortimer Evans | 20 and 21 May | 24 and 25 March |
| Kin Kin, *viâ* Cooran | Kin Kin and District Farmers' Progressive Association | A. C. Stewart ... | | |
| Kooroongarra, *viâ* Inglewood | Kooroongarra Farmers' Progress Association | J. French ... ... | | |
| Laidley ... | Farmers' Progress Association ... | G. A. Moulday ... | | |
| Laidley ... | Lockyer Agricultural and Industrial Society | W. A. McIlwraith | | |
| Lake Clarendon (*viâ* Gatton) | Lake Clarendon Branch of the Queensland Farmers' Union | W. J. Walton ... | | |
| Lockrose ... | Lockrose and District Farmers' Progress Association | R. W. L. Raymont | | |
| Lockyer ... | Lockyer Agricultural and Industrial Society | John T. Laing ... | | |
| Longreach ... | Longreach Pastoral and Agricultural Society | A. Petersen ... | 4 and 5 May | |
| Lowood ... | Lowood and Tarampa Pastoral and Agricultural Association | W. E. Michel ... | 13 and 14 May | |
| Mackay ... | Pioneer River Farmers and Graziers' Association | T. J. Leonard ... | 23 and 24 June | |
| Macnade, *viâ* Lucinda | Macnade Farmers' Association | E. S. Waller ... | | |
| Mapleton ... | Mapleton Fruitgrowers and Farmers' Progress Association | J. G. Smith ... | | |
| Marburg ... | Marburg and District Agricultural and Industrial Association | A. H. Bielefeld ... | 2 and 3 June | 2 and 3 June |
| Mareeba ... | Mareeba District Mining, Pastoral, Agricultural, and Industrial Association | W. A. Ferguson ... | 25 and 26 May | |

## AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914. | 1915. |
| Maryborough | Wide Bay and Burnett Pastoral and Agricultural Society | H. A. Jones ... | 2, 3, and 4 June | 1, 2, and 3 June |
| Miles ... | Miles District Agricultural and Pastoral Society | T. P. Goonan ... | ... | 21 April |
| Mitchell ... | Maranoa Pastoral, Agricultural, and Industrial Association | Neil Hammond ... | 12 and 13 May | 11 and 12 May |
| Mondure, *viâ* Wondai | Mondure Farmers and Dairymen's Association | G. E. Compagnoni | | |
| Montville ... | Montville Fruitgrowers and Farmers' Progress Association | F. W. Thompson ... | | |
| Mooloolah ... | Mooloolah and Glenview Farmers' Progress Association | William Ellison ... | | |
| Mount Larcom (Gladstone) | Wilmott Farmers' Progress Association | J. J. Kelly... ... | | |
| Mount Larcom | Mount Larcom Farmers' and Canegrowers' Association | R. R. Nöthling ... | | |
| Mt. Marshall, *viâ* Allora | Mount Marshall Farmers' Progress Association | J. Rooney ... ... | | |
| Mullet Creek | Mullet Creek Farmers' Association... | G. Lee ... ... | | |
| Mundubbera | Mundubbera Farmers and Settlers' Progress Association | W. G. Parker ... | | |
| Murgon ... | Murgon Branch of the Queensland Farmers' Union | W. D. Davidson ... | | |
| Murray's Creek | Murray and Baffle Creek Progress and Farmers' Association | T. J. Gee ... | | |
| Nambour ... | Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society | A. H. Bushnell ... | 8 and 9 July | |
| Nambour ... | Bli Bli Farmers and Fruitgrowers' Progress Association | F. Pashen ... ... | | |
| Nanango ... | Nanango Agricultural, Pastoral, and Mining Society | Stuart Cavaye ... | 27 and 28 May | 4 and 5 May |
| Nerang ... | Southern Queensland and Border Agricultural and Pastoral Association | Edgar J. Foote ... | | |
| North Arm, N. C. Railway | North Arm Farmers' Progress Association | J. F. Fountain ... | | |
| North Pine ... | The Pine Rivers Agricultural, Horticultural, and Industrial Association | G. W. Armstrong... | 25 and 26 June | |
| Oakey ... | Oakey Agricultural and Pastoral Society | Alan B. Stanley ... | 9 Sept. | |
| Okeden, *viâ* Wondai | Proston, Okeden, and Wigtoun Settlers' Association | R. McNamara ... | | |
| Oman-ama ... | Redbank Farmers' Progress Association | W. K. Ison ... | | |
| Palmwoods ... | Queensland Farmers' Union (Palmwoods Branch) | W. Browne ... | | |
| Palmwoods ... | Palmwoods Progress and Fruitgrowers' Association | Hugh McVair McKay | | |
| Philpott, *viâ* Gayndah | Philpott Farmers' Society ... ... | R. H. Roe-Russell | | |
| Pickanjennie | Pickanjennie Farmers' Progress Association | J. Proud ... ... | | |
| Pittsworth ... | Pittsworth Pastoral, Agricultural, and Horticultural Association | W. O. Hare ... | 28 Jan. | 27 Jan. |
| Pomona ... | Noosa Agricultural, Horticultural, and Industrial Society | W. B. Smith ... | 4 and 5 Nov. | |
| Proserpine ... | Proserpine Farmers and Canegrowers' Association | W. B. Caswell ... | 17 July | |
| Ravenshoe ... | Ravenshoe Farmers and Graziers' Progress Association | W. R. Sorlleux ... | | |
| Roche Creek, *viâ* Miles | Roche Creek Farmers' Progress Association | G. F. Smith ... | | |
| Rockhampton | Alton Downs Farmers' Association... | G. T. Crook ... | | |

## AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914. | 1915. |
| Rockhampton | Rockhampton Agricultural Society ... | H. Hill ... ... | 18, 19, and 20 June | |
| Rockhampton | Jardine Farmers and Fruitgrowers' Progress Association | R. Lamain ... | | |
| Rockhampton | Fitzroy Farmers' Progress Association | T. Ritchie ... ... | | |
| Roma | Western Pastoral and Agricultural Association of Queensland | Angus McPherson | 19 and 20 May | 18 and 19 May |
| Roma ... | Euthulla and Upper Bungil Farmers and Settlers' Association | John J. Maun .. | | |
| Rosewood ... | Rosewood Agricultural and Horticultural Association | A. J. Loveday ... | 29 and 30 July | 28 and 29 July |
| Sexton ... | Sexton Farmers and Settlers' Progress Association | W. K. Harvey .. | | |
| Speedwell, *viâ* Stalworth | Speedwell Farmers' Progress Association | Aubray U. Potter | | |
| Springsure ... | Springsure Pastoral and Agricultural Society | W. Fisher ... ... | 13 and 14 May | |
| St. George ... | Balonne Pastoral and Agricultural Association | Mark Roberts | | |
| Stanthorpe ... | Stanthorpe Agricultural Society ... | A. E. Bateman ... | ... | 3, 4, and 5 Feb. |
| Tabragalba ... | Tabragalba and Canungra Farmers' Progress Association | A R. Ludwig ... | | |
| Takura, *viâ* Maryboro' | Takura Farmers' Union ... ... | S. E. Tooth ... | | |
| Teutoberg ... | Teutoberg Farmers' Progress Association | E. H. Ochmichen ... | | |
| The Caves, *viâ* Rockhampton | Mount Etna Farmers and Selectors' Progress Association | Geo. Smith ... | | |
| Yandina Creek *viâ* North Arm, N.C. Line | Yandina Creek Farmers and Settlers' Progress Association | J. D. Benfer ... | | |
| Tolga ... | Tolga Forest Farmers' Union ... | H. Northey ... | | |
| Toowoomba... | Royal Agricultural Society of Queensland | J. C. Robertson .. | 21 to 23 April | 13, 14, and 15 April |
| Toowoomba... | Toowoomba White Growers' Association | A. C. Salmon ... | | |
| Townsville ... | Townsville Pastoral, Agricultural, and Industrial Association | J. N. Parkes .. | 14 and 15 July | |
| Wallumbilla | Wallumbilla Farmers' Association ... | H. A. Watson ... | | |
| Warwick ... | Eastern Downs Horticultural and Agricultural Association | F. H. Selke .. | 10 to 12 Feb. | 9, 10, 11, & 12 Feb. |
| Wellington Point | Wellington Point Agricultural, Horticultural, and Industrial Association | E. Ziegenfusz ... | 4 July | |
| Wondai ... | Wondai Agricultural, Pastoral, and Industrial Society | H. J. Compagnoni | 13 and 14 May | 26 and 27 May |
| Wondalli, *viâ* Goondiwindi | Wondalli-Yelarbon Farmers' Progress Association | L. C. G. Cameron | | |
| Woodend ... | Warren-Woodend Farmers' Club ... | W. Lehfeld ... | | |
| Woodford ... | Woodford Agricultural, Pastoral, and Industrial Society | G. H. Osmond ... | 28 and 29 May | |
| Woombye ... | North Coast Agricultural and Horticultural Society | E. E. McNall ... | 10 and 11 June | |
| Woombye ... | Woombye Fruitgrowers' and Progress Association | J. Cossar Smith ... | | |
| Woongarra ... | Woongarra Canegrowers and Farmers' Union | H. A. Cattermull... | | |
| Woowoonga Scrub | Woowoonga Farmers and Canegrowers' Association | Thos. Wilkins ... | | |
| Yandina ... | Maroochy River Farmers' Union and Progress Association | W. R. Braydon .. | | |
| Yingerbay .. | Yingerbay Dairymen and Farmers' Association | R. Frederick ... | | |
| Zillmere ... | Zillmere Agricultural, Horticultural, and Industrial Society | Arthur B. Marquis | 3 Oct. | |

# Departmental Announcements.

The Editor will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

Secretaries of Associations are requested to be good enough to forward to the Editor, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published.

It is equally necessary that prompt notice be given to the Editor of changes in the Secretaryship of any Society or Association, a matter which is much neglected. Furthermore, information concerning dates on which shows are to be held must be forwarded to the Editor at least six weeks before the Show date. If these suggestions are not complied with, the Society whose Secretary neglects to supply the required information will be liable to be struck off the list of Societies published monthly in the Journal

To enable recipients of the *Queensland Agricultural Journal* to have the half-yearly volume bound, Covers in Boards and Cloth will be supplied from this Office on application to the Under Secretary for Agriculture. Applications must be accompanied by a remittance to cover cost. Covers will be supplied at ONE SHILLING and ONE SHILLING AND NINEPENCE each.

In order to avoid disappointment, correspondents who wish for replies to questions in the *Journal* are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

Persons desiring to communicate with the Queensland Agricultural College and State Farms are requested to address their correspondence to the Principal of the College, Gatton, and to the Managers of the State Farms. The State Farms are: Hermitage (Warwick), Gindie (*viâ* Springsure), Warren (Stanwell), Bungeworgorai (Roma), Kairi (Tolga), Kamerunga State Nursery (Cairns).

We would ask our Subscribers to note that, when their Subscription has run out, a RED CROSS is placed against the Order Form. It often happens that this intimation is disregarded, with the result that the JOURNAL is NOT POSTED to the Subscriber. The Department cannot guarantee to supply back numbers in such cases.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the Institution. Supplies of hot water and milk can be obtained at the College, if desired.

The Department has now prepared a booklet on "Flower Gardening for Amateurs," which may be obtained on application to the Under Secretary for Agriculture and Stock. Price, TWO SHILLINGS.

PAMPHLETS on different subjects relating to Agriculture, Horticulture, and Stock are issued by the Department, and may be obtained gratis, on application to the Under Secretary.

## NOTICE OF SHOW DATES.

We wish to draw the attention of Secretaries of Agricultural and Pastoral Societies and Associations to the importance of promptly notifying the Editor of any change in the dates on which shows are to be held.

NOTICE.

All communications in connection with the Journal, inquiries, &c., should be addressed to "The Editor" only. Letters addressed personally are liable to delay in reply.

No replies can be given to Anonymous letters. The writers are requested to sign their communications, not necessarily for publication.

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# QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

## FOR SALE.

GRASS ROOTS.—Paspalum, Rhodes, and African Wonder.

POULTRY DEPARTMENT.

The College has for sale Poultry of the following breeds:—Brown Leghorn, White Leghorn, Silver-Grey Dorking, Indian Game, Plymouth Rock, Black Orpington, Buff Orpington, Silver-Laced Wyandotte, and White Wyandotte.

PRICES.

Cockerels, 10s., 15s., and 21s., f.o.b., Gatton

Pairs—Cockerel and Pullet—30s. and 42s., f.o.b., Gatton.

Trios—Cockerel and Two Pullets—42s. and 63s., f.o.b., Gatton.

Prices vary, as above stated, according to quality. Additional charges of 2s. for a single bird and 1s. for each additional bird will be incurred by purchasers who fail to return crates promptly.

Eggs of the above breeds are offered for sale during the season, 1st July to 30th November. Price, 10s. per setting of twelve, F.O.B., Gatton. Nine eggs in each setting are guaranteed fertile. Should less than nine prove to be fertile, the infertiles will be replaced, if returned, carriage paid, and unbroken.

(N.B.—An infertile egg is uniformly translucent when held up to a strong light. Settings should be allowed to settle 24 hours before being placed under the hen.)

In cases where eggs cannot be sent otherwise than by parcel post, sixteen eggs will be sent to a setting, and no responsibility will be taken in connection with the replacing of any eggs which fail to hatch.

Applications for birds or eggs should be accompanied by remittance and addressed to the Principal, Agricultural College, Gatton.

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The following Stud Animals are available for Service at the College Farm:—

AYRSHIRE—

Netherton King George, Imported. Sire: Netherton King Arthur. Dam: Midland Young Greenfield.

SHORTHORN BULL—

Bloomer of Darbalara. Sire: Emblem of Darbalara, 100 M.S.H.B. Dam: Lucy II., 1038 M.S.H.B.

Sows may be served also by imported Berkshire, British Large Black, and Yorkshire Pigs, at a charge of 5s. for each service.

Consequent on the numerous orders on hand for Pigs for forward delivery, it will be several months before there is any likelihood of fresh orders being filled.

A charge of TWO SHILLINGS and SIXPENCE will be made if Sows are left at the College for three weeks, for second service if required, for the keep of each animal.

Orders will be accepted after the 1st January, 1915, for BERKSHIRE and YORKSHIRE BOARS. It will, however, be some months before orders for Sows of either breed can be booked.

J. BROWN, Principal.

## FOR SALE.

GRASS ROOTS.—Paspalum and Rhodes Grass at 2s. 6d. per sack. F.O.B., Gatton.

Applicants will be supplied on receipt of remittance to the amount of the Order.

Japanese Millet Seed. Price, 3d. per lb., or 25s. per cwt. F.O.B., Gatton.

There are no other Farm Seeds or Produce at present for Sale at the College.

## QUEENSLAND AGRICULTURAL COLLEGE.

The College, which is situated within 4 miles of Gatton and 1 mile from the College Railway Siding, comprises 1,692 acres, and the buildings can accommodate 60 Students.

### TERMS.

TWENTY-SEVEN POUNDS per annum, paid half-yearly in advance. Students are also charged One Pound per annum each for medical attendance, the sports fund, and for guarantee fee.

The course of instruction includes PRACTICAL AGRICULTURE in all its branches, DAIRYING, GARDENING, STOCK-BREEDING, and MECHANICAL ARTS. Classes are also held daily for THEORETICAL INSTRUCTION in these branches, as well as in SURVEYING, CHEMISTRY, &c.

The College Calendar, giving full particulars, may be obtained on application to the Principal at the College, or to the Under Secretary for Agriculture and Stock, Brisbane.

### BURSARIES.

Four bursaries are given annually. An examination for these is held in December of each year. Bursaries will be awarded upon the following conditions:—Candidates (males) to be from fifteen to eighteen years of age, of sound constitution, and in good health; they must have resided in the State for the two years immediately preceding the time of their examination for such bursary; or their parents must have resided in the State three years immediately preceding such examination. The bursar is entitled—subject to good behaviour and the pleasure of Parliament—to free board and instruction as a resident student for a period of three years. He is required to take up his residence at the College within one month of the publication of the results of the examination; otherwise he forfeits his right to a bursary.

The AGE of CANDIDATES for Admission to the College as Students is Fourteen Years.

THE UNDER SECRETARY,
Department of Agriculture and Stock, Brisbane.

Full particulars and conditions on application to

# THE UNIVERSITY OF MELBOURNE.

## VETERINARY SCHOOL.

**Complete courses of instruction** are conducted in all subjects **for the degree of Bachelor of Veterinary Science (B.V.Sc.).**

**Veterinary Surgeons** possessing the above qualifications **are eligible** for registration under the Veterinary Surgeons Act (Victoria) and **for veterinary appointments in the Commonwealth and State Services and in the Army Veterinary Corps.**

For full particulars apply—

The DIRECTOR,
Veterinary School, Parkville,
Victoria.


# GOVERNMENT AGRICULTURAL LABORATORY.

## INSTRUCTIONS FOR THE COLLECTION OF SAMPLES, AND SCALE OF FEES.

### GENERAL INSTRUCTIONS.

1. All analyses will be carried out in the order in which the samples are received at the Laboratory, with the exception of perishable substances, which will be analysed immediately after arrival.

2. Should any person wish for an immediate analysis, the fee, charged in accordance with the scale of fees below, will be increased by 50 per cent.

3. The samples may be forwarded by parcel post or by rail, carriage paid, to the

*Under Secretary for Agriculture and Stock, Brisbane.*

In all cases a letter, giving full instructions as to the information required, and enclosing the prescribed fee, must be sent at the same time

4. Analyses will only be carried out if these instructions are adhered to, and if the samples are taken in accordance with further instructions issued below.

5. The Under Secretary may, under special circumstances, modify the fees charged for analytical work.

| SCALE OF FEES. | £ | s. | d. | For Farmers.* £ | s. | d. |
|---|---|---|---|---|---|---|
| Soil—Partial chemical analysis, estimation of lime, potash, phosphoric acid, nitrogen | 1 | 1 | 0 | 0 | 10 | 6 |
| Soil—Complete chemical analysis, including available plant foods soluble in citric acid | 3 | 3 | 0 | | | |
| Soil—Mechanical analysis, as capacity for water capillarity, absorptive power, &c., for each sample extra | 1 | 1 | 0 | | | |
| Limestone, cement, clay, marls, &c. | 2 | 2 | 0 | 0 | 10 | 6 |
| Water—Partial analysis, giving total solids, loss on ignition, and chlorine | 0 | 10 | 6 | | | |
| Water—Complete analysis | 3 | 3 | 0 | | | |
| Fertilisers—Determination only of— | | | | | | |
| Water soluble, Citrate soluble, insoluble, and total phosphoric acid (each) | 0 | 15 | 0 | 0 | 3 | 0 |
| Potash | 0 | 15 | 0 | 0 | 3 | 0 |
| Nitrogen, total Nitrogen, Nitrogen as nitrates, Ammonia salt or otherwise (each) | 0 | 12 | 6 | 0 | 3 | 0 |

SCALE OF FEES—*continued.*

| Analysis of— | £ | s. | d. | For Farmers.* £ | s. | d. |
|---|---|---|---|---|---|---|
| Dried blood | 0 | 15 | 0 | 0 | 3 | 0 |
| Bone dust | 1 | 10 | 0 | 0 | 6 | 0 |
| Superphosphate | 1 | 10 | 0 | 0 | 6 | 0 |
| Thomas phosphate or Basic slag | 1 | 10 | 0 | 0 | 6 | 0 |
| Blood and Bone manure | 1 | 10 | 0 | 0 | 6 | 0 |
| Meatworks manure | 1 | 10 | 0 | 0 | 6 | 0 |
| Meatworks manure, including fat | 2 | 0 | 0 | 0 | 9 | 0 |
| Mixed fertilisers | 3 | 0 | 0 | 0 | 10 | 6 |
| Food stuffs—Grains, Grasses, Oilcake, Ensilages, &c.— | | | | | | |
| Complete analysis, giving moisture, albuminoids, oil, or fat, carbohydrates, ash, raw and digestible fibre | 2 | 2 | 0 | 0 | 10 | 6 |
| Estimation only of— | | | | | | |
| Moisture | 0 | 5 | 0 | | | |
| Albuminoids | 0 | 10 | 0 | | | |
| Oil or fat | 0 | 7 | 6 | | | |
| Ash | 0 | 5 | 0 | | | |
| Total fibre | 0 | 7 | 6 | | | |
| Digestible fibre | 0 | 7 | 6 | | | |
| Testing of Wheats, milling quality, analysis of flour | 1 | 0 | 0 | | | |
| Milk and Cream—Fat, total solids, and tests for preservatives | 0 | 10 | 0 | | | |
| Milk and Cream Fat only | 0 | 2 | 6 | | | |
| Butter, cheese, condensed milk—Commercial analysis | 1 | 1 | 0 | | | |
| Ditto—Complete analysis | 2 | 2 | 0 | | | |
| Butter—Boric acid determination | 0 | 5 | 0 | | | |
| Ditto—Boric acid, and other preservatives, for export certificates | 0 | 10 | 6 | | | |
| Salt | 1 | 1 | 0 | | | |
| Parchment paper | 0 | 10 | 6 | | | |
| Dipping solution, arsenical dips, prickly-pear destroyers, &c. | 0 | 10 | 0 | | | |
| Tanning materials—Assay of tannin | 1 | 0 | 0 | | | |
| Sugar, Syrups, Molasses | 1 | 1 | 0 | | | |
| Insecticides, Fungicides | 1 | 1 | 0 | | | |
| Soaps—Commercial analysis | 1 | 10 | 0 | | | |

The fee for any other analytical work not mentioned may be learned on application.

## INSTRUCTIONS FOR TAKING AND COLLECTING OF SAMPLES.

### SOILS.

A rough sketch of the field, paddock, or block of land from which the samples are to be taken should be prepared to accompany the samples. The spots where the samples are taken are marked on this plan, and are numbered. This sketch plan should also indicate position of roads, creeks, gullies, ridges, general fall, and aspect of land, &c.

Should the soil in various parts of the block show a very marked difference, it will be necessary to divide the block into two or more parts. Should the different soil occur only in a small patch, this sample may be left out.

Not less than three samples should be taken in each section. A greater number is to be preferred, as a better average will be obtained. In order to obtain a fair average sample of the soil from a block of land,

* Reduced fees apply only to *bonâ fide* farmers, gardeners, fruitgrowers resident in Queensland.

as nearly as possible equal quantities of soil are collected from various parts of the field.

At the places chosen for the taking of the samples the surface is slightly scraped with a sharp tool, to remove any surface vegetation which has not as yet become part of the soil.

Vertical holes from 10 to 18 inches square are dug in the ground to a depth of 3 feet. The holes are dug out like post-holes; an earth-auger facilitates the operation considerably, and the holes may be trimmed with the spade afterwards, and the holes cleaned out.

Careful note of the appearance of the freshly cut soil of any intermediate layer and of the subsoil should be taken. The depth of the real soil, which in most cases is easily distinguished, is also measured and noted for each hole. Note how deep the roots of the surface vegetation reach into the soil. If the soil changes gradually into the subsoil, as is the case in some places where the soil is of very great depth, this line of division can only be guessed approximately, and it is best to take the soil uniformly to a depth of 12 inches.

With a spade a slice of soil, from 3 to 4 inches thick, down to the beginning of the subsoil or to a depth of 12 inches, is now cut off and put on to a clean bag. The same is done with the subsoil, and the slice is taken from where the soil ends (or 12 inches) to the bottom of the hole, and this subsoil placed on another bag. Stones over the size of a pea may be picked out, the rough quantity of such stones estimated, and a few enclosed with the samples. Fine roots must not be taken out from the soil samples. The same operation is repeated at the other places chosen. Take careful note and give description of soils in each hole, as numbered and marked on plan. The samples of soil collected on the one bag are thoroughly mixed by breaking up any large clods, and about 10 lb. of the mixed soil are put into a clean canvas bag, which is securely tied up and labelled. The same is done with the samples of subsoil collected separately on the other bag.

All the samples collected are afterwards placed in a wooden box.

It is important to use clean bags and clean boxes, and also that the samples should not be left in the neighbourhood of stables or manure heaps.

A short description of the land must accompany the samples and the sketch plan. In the case of cultivated land, state how long the land has been under cultivation, what crops were chiefly grown, result of such crops, was any manure applied, when, and what sort, and in what quantities per acre. In the case of virgin soil, state if the land was heavily timbered or not, ringbarked, if scrub or forest land, what sort of timber was chiefly growing on the land. In all cases a description of the neighbouring land, outcropping rocks, &c., are of great value. Also state if the land is naturally or artificially drained or not; describe the land as regards its position to hills, roads, creeks, ridges, &c.

Only by adhering strictly to these instructions, and by giving minute details can benefit be derived from the soil analyses.

Special forms of application for "*Advice as to Manurial Treatment of Soil*" have been prepared, and may be obtained from the Under Secretary, Department of Agriculture and Stock.

It is strongly advised to fill up one of these forms in each case when a sample of soil is submitted for analysis.

## WATER.

It is best to collect and forward samples of water for analysis in stoppered glass bottles, generally known as Winchester quarts.

The bottles have to be perfectly clean, and stoppers must fit well. Corks should be avoided, but if used must be new and well washed with the water before being used for closing the bottle.

When taking waters from taps, pumps, bores, the water must be allowed to run for a while before taking the sample. When taking the water out of a well, pond, or river, the bottle is completely immersed, but care must be taken not to disturb the mud or sediment at the bottom of the water. Before the sample is actually collected, the bottle is rinsed three times with the water, filling each time about one-third full. The bottle is then filled within about 1 inch from the top; the stopper is inserted and securely tied down with a clean piece of linen or calico.

The stopper must not be fastened or luted with sealing-wax, paste, plaster of paris, &c.

State for what purpose the water is to be used, as for irrigation, household purposes, factory use, steam boilers, stock, &c.

Forms of application for "*Analysis of Water*" have been prepared, and may be obtained from the Under Secretary, Department of Agriculture and Stock. Suitable bottles for taking samples of water, both for chemical analysis and for bacteriological examination, may also be obtained on application.

## FERTILISERS.

When taking samples of artificial manures from bags, the samples must be taken from different bags and at different places of the bag and not only from the top; or the contents are emptied on a heap and mixed up well, and the samples then taken.

The samples sent for analysis should not weigh less than ½ lb., and not more than 2 lb., and should be contained in a clean, dry bottle (lightning jars are very suitable), or stone jar, or in tins with tightly-fitting lids. To each sample must be securely attached a label, giving all the particulars required by the regulations in connection with "*The Fertiliser Act of* 1914."

In the case of taking samples from a large quantity of manures the following rules should be observed:—

Pick out here and there from the whole of bags or parcels a number of sound, undamaged bags, at the rate of about two or three bags for each twenty, or not less than five bags for a lot of fifty bags and over. The contents of these bags should be emptied on to a clean dry floor, and should be thoroughly mixed with a shovel, taking care to crush any coarse lumps. After being well mixed, the heap should be spread out and levelled down uniformly to about one spade's depth. From this heap at different places should be taken eight separate small spadesful, which should be mixed again on a clean board or on a large sheet of paper; and from this small heap three clean, dry bottles, stone jars, or tins with patent lids of about ½ lb. capacity should be filled.

All operations must be carried out as quickly as possible in order to avoid a loss or in some cases an increase of moisture in the sample.

## FOOD STUFFS.

It is always important to obtain good average samples, and this can only be done by great care in taking the samples from different places, mixing well, and taking a small part of the mixture. This method would apply to any dry foodstuff—as grains of any kind, peas, beans, chaff, pollard, meal, &c. For the analysis of green foods—as green hay, sorghum, silage—it is best to make a mixture of the sample by passing it through a chaffcutter, and by taking an accurately weighed quantity—say 3 lb. This quantity is then dried in the sun, taking care that nothing is lost, and when dry put in a bag and forward for analysis, stating how much of the original green stuff the total amount of the dried material sent represents.

To collect information about value of *green manures*, it is best to plot out exactly 1 square yard in the field covered with the plant, not picking out a position where the growth is very heavy or poor, but about a fair average. Four pegs are driven into the ground at the four corners, and string stretched between them; with a sharp spade all the plants are cut along the strings, so as to get really the growth of 1 square yard. The plants are all collected and accurately weighed, passed through a chaffcutter, and the sample for analysis taken as above described. In many cases the roots may be also pulled out, weighed separately, and a sample forwarded.

The samples must be accompanied by a description of the crop—when planted, how old when cut, if the land was manured or not, weight of crop per acre or per square yard, and weight of the sample forwarded when in its green state. In the case of green manures it is generally best to take the samples just after flowering, and immediately before ploughing in.

*Wheat.*—Samples of wheat sent to be tested for their milling qualities, and analyses of flours obtained therefrom, should not weigh less than 2 lb. each, and should be well cleaned and free from weevils. Give full particulars about the locality in which the wheats were grown, and also the weight of the crop in bushels per acre.

*Milk and Cream* are best preserved for analysis by adding to every 8 oz. of liquid about 5 grains of powdered bichromate of potash, and mixing the sample with the preservative by shaking the bottle.

Should it be desired to have a sample of milk or cream tested for preservatives, a second sample should be sent in its natural state.

The sample bottles should be closed with a well-fitting cork, and placed with the cork downwards in the boxes, so that the cream will not collect on the cork but on the bottom of the bottle.

## DIPPING FLUIDS.

Special forms for taking and forwarding dipping fluids for analysis may be obtained on application.

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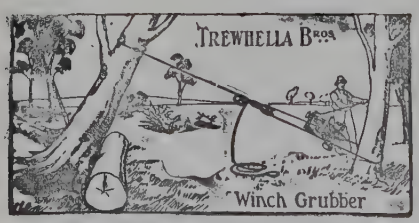


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QUEENSLAND AGRICULTURAL JOURNAL

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# Agriculture.

## INTERESTING ENTRIES FOR THE LIVE STOCK EXHIBIT AT THE PANAMA PACIFIC INTERNATIONAL EXPOSITION.

From the Editorial Bureau, Panama-Pacific International Exposition, we have received the following particulars of entries for the live stock exhibit:—

Entries were received recently (6th October, 1914) by I. D. Graham, Assistant Chief of the Department of Live Stock for the Panama-Pacific International Exposition at San Francisco, for the class of Karakule fur-bearing sheep, of which variety there are several flocks of small size now in the country. Entries will be exhibited at the Exposition both from various parts of the United States and from Persia and Turkey, the original home of the animal. Exhibits will also be made of the Karalinos, a cross between the Karakule and the Lincoln sheep, the pelt of which, dyed and trimmed, is the source of most of the beautiful furs worn by women. The Karakule is the only source of Astrachan, and its wool commands a high price. Fat-tailed sheep will also be shown from Persia, where the animal is bred and raised especially for the fat in its tail, which often becomes so heavy as to make it difficult for the animal to move about. The oil obtained from the fat-tailed sheep is used in cooking and by watchmakers for mechanical purposes.

Three of the six great silos being erected for the Department of Live Stock are now completed, and within the next ten days the ensilage will be prepared from corn which is being shipped to the grounds from the interior to be chopped into feed and put away in the silos for feeding

the live stock during the exposition. The preparation of the ensilage, a process of considerable novelty in California, will be observed by a large number of interested spectators. The operation will constitute one of the first working exhibits of the Exposition.

Communications received from abroad by the Live Stock Department indicate that negotiations are being successfully carried on for the bringing to the Exposition next year of two new breeds of horses from Brittany and Boulogne, France, where these animals are raised. The "Bretonnes" and the "Boulonnaise," the names given to these breeds, are the subject of particular interest on the part of the French Government, which is anxious to establish a demand abroad for registered animals of this class, as has been done with the Percherons. The province of La Perche has been enriched for many years by the buyers from foreign countries who have come there for registered animals. The support of the Minister of Agriculture of France has already been promised, and the assistance of such men as Mr. Lemaitre, Mr. Le Gentil, Baron D'Herlincourt, and the Messrs. Calais Brothers has already been obtained.

Great interest has already been aroused all over the United States among farmers, ranchers, and horsebreeders in these new breeds, owing to the fact that they are declared by judges to be the animals for practical use, the Bretonne for light work and the Boulonnaise for heavy draft purposes. A few of these animals have already been brought to this country, and an exhibit of the types at the Panama-Pacific International Exposition would create a sensation in stock-breeding circles.

Assistant Chief I. D. Graham, of the Department of Live Stock of the Panama-Pacific International Exposition, has just received word that there is a possibility of exhibiting specimens of the famous Chillingham wild white cattle in the department next year at San Francisco. Eugene Grubb, who is abroad as special commissioner for the department, reports that Lord Chillingham, who owns these cattle, has offered specimens to be shown at the Panama-Pacific International Exposition, without purchase cost. The cattle were first inclosed in Chillingham Park in 1220, since which time there has not been a single infusion of new blood, and yet they have reproduced themselves in purity of type. They have been traced to the white bull of Caledonia, with whose history and fabled stories practically every Scotchman is familiar; and, with the exception of two animals which were trapped and given to the Zoological Gardens of London, none of these cattle have ever gone out of Chillingham Park except as carcasses. The animals are snow white, with black noses, black horns, and red ears. They have crescent-shaped horns, and there is some evidence they formerly had manes. They are exceedingly wild and fierce, and are supposed by some authorities to be the progenitors of all breeds of cattle now existing in Occidental countries. They will become permanent residents of Golden Gate Park after the Exposition.

The Goat-breeders' Association, which is taking an active interest in the Live Stock Show, which is to be continuous throughout the Exposition period, promises that the Angora goat representation will be of unusual interest. Some Australian goats are to be shown, which produce mohair of so fine a quality it is utilised in the manufacture of "false" hair for milady's adornment.

### THE USE OF LIME.

In connection with the use of lime on the land, Mr. J. C. Brünnich, Agricultural Chemist, says that most of the land on the North Coast Line requires lime, which, according to the class of land, is applied in the form of quicklime for heavy clayey soils, or in the form of coral sand or limestone screenings for lighter sandy soils. Carbide refuse is pure lime (slaked lime), and can be used for liming land. Disslaked quicklime or carbide refuse is used at the rate of about 1 ton per acre; limestone screenings up to 2 tons per acre. The lime is applied broadcast and slightly cultivated under. Lime only acts on nitrogenous manure, and should not be mixed and applied at the same time with such manure. If lime is applied three or four weeks before other manures, no losses can take place.

## MARKET GARDENING.*

### PEAS.

Many amateur market gardeners have a very hazy idea of the proper seasons during which to sow and plant different vegetables, and, as an example of this want of experience, take peas and French beans. There are really only about four months in the year when peas are unlikely to succeed. The time for sowing these in Queensland is from January to September. During these months, sowings should be made once a fortnight so as to keep up a constant succession. The autumn sowing, say in April or May, should consist of the earliest varieties. These are usually the wrinkled kinds. These may also be sown in June. In July and August, sow marrows, and American Wonder, Giant Luscious, Yorkshire Hero, Pride of the Market, and Veitch's Perfection.

All tall varieties must be supported on brushwood, sticks, or wire netting, fixing the netting about 10 in. above the ground.

As for soil, peas succeed best on a deep, rich loam. Soil that has been manured for a previous crop will suffice for the winter-sown crops of peas, as rich soil tends to produce an undue proportion of haulm; but for summer crops, an additional dressing should be given, and

* Whilst we are always ready to respond to all inquiries from correspondents on any subject in connection with rural or household pursuits, we would point out that, as far as market gardening is concerned, our correspondents would save themselves much trouble and possible delay if they would apply for the pamphlet on "Market Gardening" issued by the Department of Agriculture and Stock, which deals with almost every phase of the subject.—Ed. "Q.A.J."

the ground trenched or dug very deeply; or, a shallow trench may be made, as for celery, for each row of peas, and well manured. The depth at which to deposit the seed must be regulated by the season. In winter, half an inch of soil above the seed will suffice; indeed, in damp or retentive soils, the seeds may be dropped on the surface and lightly covered; but during the summer the drills should be 3 to 4 in. in depth. For dwarf varieties the rows may be from 2½ to 3 ft. apart; for taller sorts, 4 to 6 ft. But it is better, when tall varieties requiring support are grown, that the rows should be 8 ft. or more apart, and the interspaces cropped with other vegetables, as it is found that two rows at a good distance apart will yield as much as three near together; besides, seed is saved and ground gained.

The autumn sowing should, as stated, consist of the earliest varieties. To keep up a continuous succession, it is a good rule to sow whenever the previous crop is fairly above ground. The distance at which seeds should be placed apart must be determined by the ultimate size of the variety; thus, while 1 in. apart will suffice for dwarf sorts, and 3 to 4 in. for those of intermediate size, the tallest may be 6 in. apart. In sowing during dry weather, the drills should be made in the evening and well watered, and the peas sown early next morning. It is also a good plan to soak the peas in lukewarm water for a day before sowing. To ensure good crops during dry weather, liberal supplies of water and, if possible, liquid manure must be given, and the ground mulched on each side of the rows.

## BEANS.

The season for French beans may be reckoned from the middle of August until April or May, but in many parts of Queensland they may be grown all the year round. In districts where frosts prevail no success will attend planting during the winter months. Successive sowings during the season may be made at intervals of two or three weeks when the ground is not too dry. French beans, sometimes called kidney or dwarf beans, require a rich soil, the best crops being obtained from good loams or alluvial soils, but any good garden soil with assistance from manure and water will suit them. The rows should be 3 ft. apart and the seeds at least 6 in. apart in the rows. The depth of the drills depends upon the weather and the state of the soil, from 2 to 4 in. being the average. Should the soil be dry, water it well before sowing. As with many other vegetables—such as cucumbers, for instance—the beans should be gathered as they become fit—that is, while young and tender, whether required or not. This will prolong the bearing season; and, unless some are required for seed, they should not be allowed to ripen, otherwise the powers of bearing of the plants will be considerably lessened. Amongst the best early sorts are the Early Pale Dun, Bountiful, Canadian Glory, and, for later sowing, Canadian Wonder, Negro, and "Startler" wax-pod butter beans.

There is a considerable number of varieties of beans for gardening purposes besides French or kidney beans, including the stringless butter beans, pole beans, scarlet runners, broad beans, and Lima beans. All these are annuals, except Lima beans, which are perennial in districts where there is no severe winter cold.

## POLE OR RUNNER BEANS

Are summer plants, and may be sown from September to February or March. The rows for these should be 4 or 5 ft. apart, and, before planting, poles about 6 ft. long should be set up along the rows at a distance of 3 or 4 ft. apart. Around each pole plant 6 or 8 seeds, 2 in. deep, and when they come up thin them out, leaving four of the strongest plants to each pole. It may sometimes become necessary to tie the young tendrils to the poles at first, but as soon as they begin to run they will twine around the sticks naturally without any artificial help. Broad beans do not succeed well in the hot weather, their season being from March to September. Sow in drills 3 or 4 ft. apart, 3 in. or so deep, and the beans about 9 in. apart in the rows. When the plants come into flower, their tops should be pinched off in order to check the upward growth and cause the beans to set. If this pinching is neglected, in all probability the plants will continue to grow, most of the flowers will drop off, and there will be little or no crop. The beans should be gathered as they become fit whether they are wanted or not, so as to prolong the bearing season as much as possible.

Lima beans are a good crop to grow in the summer months, as they will stand any amount of heat and dry weather, and continue in bearing for a very long time. The dwarf or bush Limas are perhaps the best to grow, as they require no poles, and consequently give less trouble. Lima beans may be planted in August or September, and again in November, and will continue to grow and bear until cut down by the frosts of winter. Dwarf Limas may be planted in drills 3 ft. apart, and the seeds 18 in. apart in the rows or in hills of four or five seeds 3 ft. apart each way. The seeds should not be planted more than 2 in. deep, and should be placed in the ground edgeways, with the eyes down.

The pole Limas require the same treatment precisely as other pole beans. French beans and most of the pole beans are *pod* beans, of which the edible part is the young and tender seed-pod. Broad and Lima beans, on the other hand, are *shell* beans, the part used for food being the bean itself and not the pod.

All of these, except the Lima, must be used when young and tender. The Lima bean may be used green (the bean itself, not the pod) or allowed to ripen, and stored for winter use. They will keep for a long time, and only require soaking in water before cooking to render them soft and palatable. They are the most delicious of the pod beans. Lima beans should be more extensively cultivated than they are, because they

will succeed in dry seasons when other beans fail, and continue to bear right through the summer.

The varieties of French beans, including butter beans, are very numerous, and each grower must choose what best suits his requirements.

Of the Limas, the largest and most delicately flavoured are Burpee's Bush Lima.

A good manure for beans is a light dressing of farmyard manure, 4 to 6 cwt. of superphosphate, and 1 cwt. of sulphate of potash (or 4 cwt. of kainit) per acre. The use of 2 cwt. of nitrate of soda per acre gives a very substantial increase of crop. An acre so treated has given an increase of nearly 50 per cent. Where 3¼ tons of French beans were obtained from an acre on which no nitrate of soda was used, 4½ tons were gathered on the same area as the result of its use.

Of late years much loss has been sustained by French-bean growers owing to the destruction caused by the Bean Fly. On this subject, Mr. E. Jarvis, Assistant Government Entomologist, says:—

"Attempts to cultivate French beans in Southern Queensland are apt to prove more or less unsuccessful, and in some districts it is almost impossible to grow this vegetable during the summer months. A crop may look promising at the start, but before long the young plants may show unmistakable signs of arrested growth, and become wilted and sickly looking, droop gradually, and at last topple over one after another is a most disheartening fashion.

"In the absence of any decided external evidence of injury, the grower is naturally somewhat at a loss to account for the cause of such failure, and is usually too disgusted to closely investigate the matter. In such cases, however, neglect is never advisable; and specimens of the affected plants, with particulars as to time of sowing and first notice of attack, &c., should be sent without delay to the Under Secretary of the Agricultural Department.

"The above symptoms are not due to climatic changes, or to the presence of fungi, but to the ravages of a small fly, the grubs of which tunnel in the stems and can easily be found if the skin of a badly-attacked beanstalk be carefully peeled in places with a sharp pocket knife. Such treatment will disclose a number of tiny pale-yellow maggots, about one-eighth of an inch long, lying close to the surface; and careful scrutiny will reveal the presence of still smaller, reddish, seed-like bodies, immediately under the dried skin, which are the pupæ from which these destructive little insects will ultimately issue."

The remedies he suggests are:—

1. Grow a small catch-crop of Canadian Wonder beans very early in the season to meet the first brood of flies, and when these plants are found, upon examination, to be harbouring good-sized grubs, pull them up and burn them without delay.

2. Root up and burn all old bean-plants immediately they have ceased to become profitable.

This and the preceding method of control are of the greatest importance, and will well repay growers for any trouble or loss of time incurred.

3. Protect the stems by hilling them up with soil until covered. (Mr. Froggatt says that Sydney market gardeners adopt this plan, which, in good growing weather, enables a damaged plant to root afresh above the injured portion.)

4. Mr. Tryon reports that the best results have been derived from growing the beans in a shallow trench and applying to the soil (so as not to touch the plants) whitewash made from acetylene refuse, or lime slaked with water, containing carbolic acid or phrenyle. Some benefit, he tells us, has been derived from "turning some of the soil back, and either painting the stalks with simple whitewash, to which a little glue has been added to promote adhesion, or sprinkling lime around them."

On small areas, for example, it might be worth while to try—as an experiment—stretching three or four lengths of coarse packing-twine over a row of dwarf beans close to the upper leaves, having first dipped the string in some attractive sticky solution. A few sticks stuck in the ground at intervals would afford all the support needed, and the device, being simple and inexpensive, would, I think, be worth trying.

## NUMBERS OF STOCK IN AUSTRALIA.

The cattle in Australia total 11,493,167. Of these there are in Queensland, 5,322,000; New South Wales, 2,836,800; Victoria, 1,528,550; Western Australia, 829,490; Northern Territory, 417,640; South Australia, 352,905; Tasmania, 205,750. The total number of sheep in the Commonwealth is estimated at 85,046,724. Of these there are 39,842,500 in New South Wales, 12,113,682 in Victoria, 21,786,600 in Queensland, 5,073,057 in South Australia, 4,418,402 in Western Australia, 1,745,356 in Tasmania, and 67,109 in the Northern Territory.

## DESTROYING TREES AND SUCKERS BY POISON.

In the issue of the Journal for November, 1914, we published an article taken from the Melbourne "Leader," giving an account of the successful clearing of 320 acres of heavily timbered land by Mr. D. Morris, Illabo, New South Wales, by poisoning. The ingredients used were given as 1 lb. arsenic, 7 lb. soda, and 4 gallons water.

Our attention was drawn to the small quantity of arsenic by Mr. P. Whiteley, of Wycarbah, Central district. He found that it needed 3½ lb. of arsenic instead of 1 lb. We submitted the question to Mr. J. C. Brünnich, Agricultural Chemist, and he said that the amount of arsenic mentioned was ridiculous, recommending also that the solution contain 4 lb. of arsenic, 2 lb. of caustic soda, to be mixed dry, and 4 gallons of water to be added slowly.

# Pastoral.

## CATTLE-GRAZING FARMS.

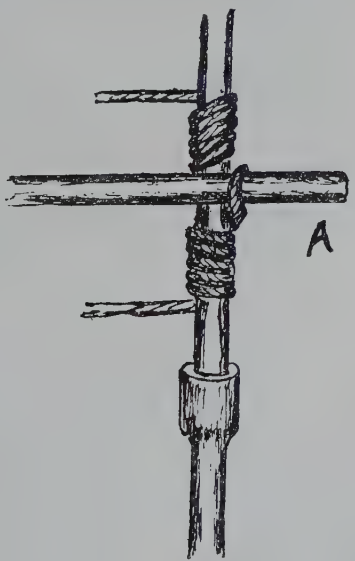
By P. R. GORDON.

It is not too much to assume that the resumption of a large area of Crown lands in the North, and its subdivision into cattle-grazing farms, will revolutionise the cattle-grazing industry of Queensland. It is a fact well known to experienced Australian graziers that, in proportion to their relative areas, the small holding will maintain, proportionally, more stock than the large runs. This has been abundantly exemplified by the operations under the Dutton Land Act of 1884. The grazing farms on the resumed halves of runs under that Act have, in most instances, carried as many sheep, under grazing farms, as were maintained over the whole of the run prior to that Act coming into operation. The reason is obvious. The fixity of tenure under the grazing farms gives the occupants every encouragement for carrying out improvements on the pastures: water conservation, ringbarking, and construction of working conveniences. There were not wanting many pessimists who viewed the coming into operation of the 1884 Act as a menace to the woolgrowing industry of Queensland by lowering the standard of the Australian merino wool. The wool sales have proved that the grazing farmers have well held their own against the larger flockmasters in the quality of their clips. Here, again, a little consideration should have suggested that, as a class, those who would take advantage of obtaining grazing farms would be men who had gone through a thorough training in sheep farming, either as managers or overseers, on sheep properties. One of the great benefits that will accrue to the State from the subdivision of runs into smaller compact cattle holdings will be that it will enable men of limited capital to embark in the business of cattle breeding and fattening; thus settling on the soil a much greater number of primary producers. But perhaps the greatest benefit, in a vast grazing country such as Queensland represents, is the facilities that will be afforded for carrying into effect a great improvement in the quality of our beef breeds of cattle, on which so much of the success of our meat export depends. That there is great scope for improvement in that respect in our general herds is but too obvious, and it is humiliating to be told by those engaged in the London meat trade that Argentina—a country that took up the business of cattle-raising only the other day, so to speak—produces better beef than Australia with its century of advantage in experience. The greatest fault in our general herds is a dearth of flesh. There is no lack of fat, but present-day meat-consumers do not eat fat, but red flesh—or lean as it is known in the trade—well mixed with fat, giving the meat that beautiful marbled appearance so characteristic of the Scotch sides which for many years commanded the highest prices in the Smithfield Market. These are principally the product of the Aberdeen-Angus cattle, or their first cross with Shorthorns. There has hitherto been a disinclination on the part of Queensland, and many other Australian cattle-breeders, to pass the black colour of the

Aberdeen cattle through their herds, although they freely admit that the meat of that breed is superior to that of all other breeds. One hesitates to call it prejudice on the part of Australian breeders. Rather it arises from the fact that Australian cattle-breeders, as a rule, have a discriminating eye for symmetry and gayety in cattle, ignoring the fact that cattle bred for purely beef purposes must necessarily sacrifice points that are essential in beauty of outline and style of carriage. Those who are likely to take up and occupy cattle-grazing farms will be men who will study utility instead of beauty of outline in their cattle, and it is safe to predict that the great Scotch beef breed will be introduced in the course of a few years on many of the grazing farms. There is another direction in which these cattle-grazing farms will tend to increase the number of cattle stock in Queensland. There are many parts of Queensland incapable of fattening stock, but on which well-framed store cattle can be raised. No doubt many of these grazing farms will be used for merely fattening of stock cattle, thus bringing into use considerable areas of inferior pasturage in breeding of cattle that are at present little, if at all, utilised for any purpose.

## TO GRIP AND TURN A ROUND CYLINDER.

It is a difficult matter to hold a round cylinder, or shaft of any description, securely, if it is desired to turn it with much pressure; as, for example, if the joints of a fishing-rod become jammed, or lengths of piping, which screw into each other, require loosening or fixing. The method shown in the cut is very useful in these cases. A length of rope




or cord is wrapped four or five times round the shaft, then doubled to form a loop into which a lever (A) is inserted, and then wrapped round the shaft again. The two ends are held in one hand, or, in the case of a big shaft, by an assistant, whilst the lever is turned. In this way very great pressure is obtained.—" Farm and Home."

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF DECEMBER, 1914.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Nellie II. ... | Shorthorn... ... | 20 July, 1914 | 964 | 3·8 | 42·89 | |
| Butter ... | ,, ... ... | 26 Nov. ,, | 865 | 4·2 | 42·64 | |
| Daisy ... | Holstein ... ... | 26 Nov. ,, | 1,025 | 3·3 | 39·51 | |
| Madam Melba | ,, ... ... | 8 Sept. ,, | 967 | 3·4 | 38·38 | |
| Bluebelle ... | Jersey ... ... | 27 May ,, | 657 | 4·8 | 37·18 | |
| Miss Melba... | Holstein ... ... | 10 July ,, | 980 | 3·2 | 36·55 | |
| Miss Edition | Jersey ... ... | 10 July ,, | 568 | 5·4 | 36·24 | |
| Rosebud ... | Ayrshire ... ... | 20 Sept. ,, | 886 | 3·5 | 36·23 | |
| Glen ... | Shorthorn... ... | 26 Oct. ,, | 752 | 4·0 | 35·26 | |
| Miss Jean ... | Ayrshire ... ... | 24 Nov. ,, | 853 | 3·5 | 34·88 | |
| Honeycombe | Shorthorn ... | 23 Sept. ,, | 758 | 3·7 | 32·81 | |
| Burton's Lily | ,, ... ... | 17 Nov. ,, | 753 | 3·7 | 32·60 | |
| Simple Interest | Jersey ... ... | 24 Nov. ,, | 552 | 5·0 | 32·56 | |
| Miss Lark ... | Ayrshire ... ... | 31 Oct. ,, | 732 | 3·7 | 31·69 | |
| Miss Bell ... | Jersey ... ... | 13 Aug. ,, | 504 | 5·3 | 31·55 | |
| Sweet Meadows | ,, ... ... | 28 July ,, | 502 | 5·2 | 30·82 | |
| Lark ... | Ayrshire ... ... | 27 July ,, | 682 | 3·8 | 30·34 | Natural pasture. |
| Pauline ... | Shorthorn ... | 12 Oct. ,, | 701 | 3·6 | 29·51 | |
| Lady Lil ... | Jersey ... ... | 22 Aug. ,, | 477 | 5·0 | 28·14 | |
| Laurette II. | Ayrshire ... ... | 10 Nov. ,, | 672 | 3·5 | 27·48 | |
| Countess of Brunswick | Shorthorn ... | 26 July ,, | 612 | 3·8 | 27·23 | |
| Lady Melba | Holstein ... ... | 6 Mar., ,, | 662 | 3·4 | 26·27 | |
| Lady Margaret | Ayrshire ... ... | 19 July ,, | 620 | 3·6 | 26·10 | |
| Iron Plate ... | Jersey ... ... | No record ... | 411 | 5·3 | 25·74 | |
| Lady Dorset | Ayrshire ... ... | 20 Sept., 1914 | 589 | 3·7 | 25·50 | |
| Noble Dot ... | Jersey ... ... | No record ... | 423 | 5·0 | 24·96 | |
| Burton's Lady | Shorthorn... ... | 23 July, 1914 | 590 | 3·6 | 24·84 | |
| Lady Spec ... | Ayrshire ... ... | 24 Oct. ,, | 584 | 3·8 | 24·38 | |
| Silver Nell... | Shorthorn... ... | 5 Oct. ,, | 598 | 3·4 | 23·73 | |
| Lowla II. .. | Shorth'rn-Ayrshire | 23 Sept. ,, | 594 | 3·4 | 23·57 | |
| Davidina ... | Ayrshire ... ... | 17 July ,, | 587 | 3·4 | 23·29 | |
| La Hurette Hope | Jersey ... ... | No record ... | 394 | 5·0 | 23·24 | |

## HORSE WITH SLIPPED SHOULDER.

Slipped shoulder is caused by an injury to the muscles, which atrophy or waste away, giving the part the appearance of the shoulder joint being out of place. In such cases treatment is of long duration. The animal should be rested, and a stiff blister such as the following applied:—Bin-iodide of mercury, 1 dr.; lard, 8 oz. It is quite possible that the first blister will not have the desired effect, and a second one should be applied in six weeks' time. Afterwards the animal should not be worked for a few months, but should be allowed to run at grass until the part has been thoroughly repaired.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, DECEMBER, 1914.

Five thousand five hundred and twenty-nine eggs were laid during the month, an average of 138·2 eggs per pen. The weather was very trying up to the 15th, the heat going to 108·9 on that date. Since then we have had some good storms, which have made it much cooler. Moritz Brothers win the monthly prize. The following are the individual records:—

| Competitors. | Breed. | Dec. | Total. |
|---|---|---|---|
| A. T. Coomber ... ... ... ... | White Leghorns ... | 152 | 1,197 |
| T. Fanning ... ... ... ... ... | Do. ... ... | 131 | 1,172 |
| Moritz Bros., S.A. ... ... ... | Do. ... ... | 160 | 1,152 |
| Loloma Poultry Farm, N.S.W. ... ... | Do. ... ... | 154 | 1,149 |
| Geo. Tomlinson ... ... ... ... | Do. ... ... | 154 | 1,102 |
| Kelvin Poultry Farm ... ... ... | Do. ... .. | 128 | 1,093 |
| Cowan Bros., N.S.W. ... ... ... | Do. ... ... | 146 | 1,084 |
| Loloma Poultry Farm, N.S.W. ... ... | Rhode Island Reds ... | 131 | 1,081 |
| R. Burns ... ... ... ... ... | Black Orpingtons (No. 1) | 142 | 1,075 |
| A. F. Camkin, N.S.W. ... ... ... | White Leghorns ... | 152 | 1,061 |
| E. Le Breton ... ... ... ... | Do. ... ... | 147 | 1,049 |
| Mrs. Munro ... ... ... ... | Do. ... ... | 154 | 1,047 |
| A. H. Padman, S.A. ... ... ... | Do. ... ... | 141 | 1,043 |
| Marville Poultry Farm, Victoria ... | Do. ... ... | 148 | 1,032 |
| Mrs. Bieber ... ... ... ... | Brown Leghorns ... | 135 | 1,025 |
| T. Fanning ... ... ... ... ... | Black Orpingtons ... | 141 | 1,025 |
| R. Burns ... ... ... ... ... | Do. (No. 2) | 138 | 1,022 |
| R. Burns ... ... ... ... ... | S. L. Wyandottes . | 130 | 1,022 |
| Derrylin Poultry Farm ... ... ... | White Leghorns ... | 152 | 1,020 |
| J. R. Wilson ... ... ... ... | Do. ... ... | 133 | 1,017 |
| J. F. Coates ... .. ... ... | Black Orpingtons ... | 114 | 1,011 |
| J. Franklin ... ... ... ... | White Leghorns ... | 139 | 1,010 |
| E. V. Bennett, S.A. ... ... ... | Do. ... ... | 146 | 1,000 |
| F. McCauley ... ... ... ... | Do. ... ... | 142 | 998 |
| J. F. Coates ... ... ... ... | Do. ... ... | 137 | 998 |
| G. E. Austin ... ... ... ... | Do. ... ... | 140 | 990 |
| R. Jobling, N.S.W. ... ... ... | Do. ... .. | 134 | 988 |
| J. M. Manson ... ... ... ... | Do. (No. 1) | 141 | 981 |
| J. Kilroe ... ... ... ... ... | Do. (No. 2) | 136 | 968 |
| J. Gosley .. . ... ... ... | Do. ... ... | 114 | 966 |
| Range Poultry Farm ... ... ... | Do. ... .. | 142 | 952 |
| J. Zahl ... ... ... ... ... | Do. ... ... | 144 | 945 |
| J. D. Nicholson, N.S.W. ... ... ... | Do. ... ... | 125 | 945 |
| D. Moreton, N.S.W. ... ... ... | Do. ... ... | 135 | 942 |
| Mrs. Bradburne, N.S.W. ... ... | Do. ... ... | 120 | 930 |
| C. M. Jones ... ... ... ... | Do. ... ... | 134 | 921 |
| J. Kilroe ... ... ... ... ... | Do. (No. 1) | 123 | 912 |
| J. Murchie ... ... ... ... ... | Brown Leghorns ... | 140 | 893 |
| J. N. Waugh, N.S.W. ... ... ... | White Leghorns ... | 125 | 892 |
| J. M. Manson ... ... ... ... | Do. (No. 2) | 129 | 871 |
| Totals ... ... ... ... | ... | 5,529 | 40,581 |

# The Orchard.

## STANTHORPE NECTARINES.

The granite country at Stanthorpe is deservedly celebrated for the excellence of the stone fruit grown in the district, and judging by a sample of the nectarines produced this season on the orchard of Mr. H. M. Jones, Rural Creek, Stanthorpe, and which is here depicted, it would seem as if this variety of fruit cannot be excelled even in the great fruitgrowing districts of the old and the new world. The sample left at our office is perfect in form, colour, and taste, and weighs 5½ oz. It

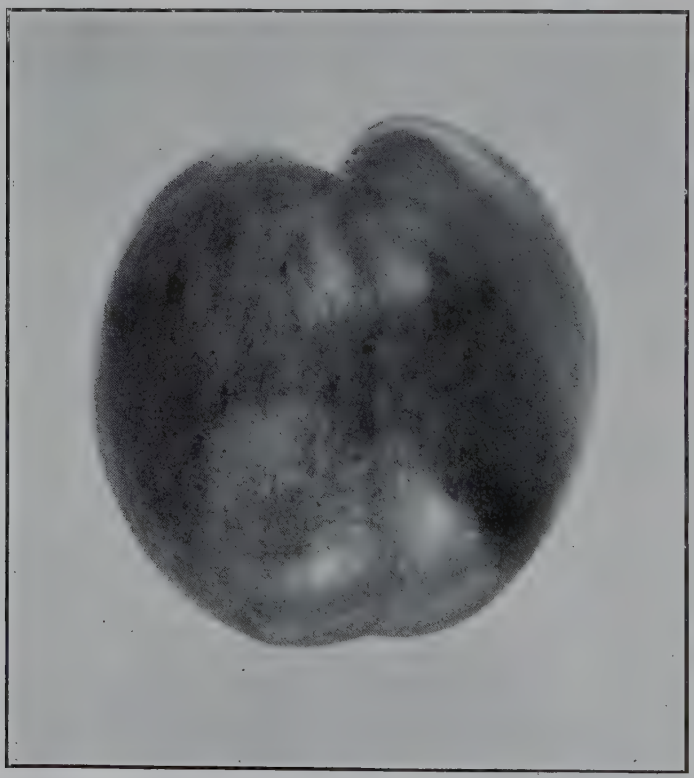


PLATE 3.—NECTARINE GROWN BY MR. H. M. JONES, STANTHORPE.

is not a picked specimen, but a representative of many which have been picked at the latter end of December. As stated, the Stanthorpe district is celebrated for its apples and stone fruits. Yet such fruit is rarely obtainable in Brisbane, the possible reason being that such a good market is found in the Southern States that, as far as apples at least are concerned, Brisbane has to depend upon apples imported from America

and Tasmania. And it is the same with gooseberries and cherries. If such fruit as Mr. Jones's were placed on the market here, it would be strange if prices equal to or higher than are obtained in the South could not be realised in our local markets.

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## INVESTIGATIONS ON PAPAYA.

Although the papaw has for many years been grown in Queensland on the coast from South to North, and that with very good results, there are still problems to be solved in connection mainly with the treating of male and female and "andromonœceous" plants—*i.e.*, plants with male and perfect flowers on the same trees; also with the formation of branches by the removal of tops to avoid damage to tall trees by high winds, and to facilitate the gathering of fruits without damage. Another point is, how to produce large fruits. All growers of papaws know that in some varieties the fruits are densely packed, and thus they interfere seriously with each other's growth.

The "Agricultural Journal of India" (October, 1914) published a most useful paper on these and other matters connected with the cultivation of the papaw, which we take from that journal in the interests of Queensland growers.

A point not touched on by the author is the packing of the fruit for transport.

We received last month from Mr. E. T. Edwards, of Marmor, North Coast Line, who has been most successful in producing large fruits, a case of papaws which had been six days packed before its receipt in Brisbane. The fruit was packed in paper, each fruit separately, and the vacant spaces filled with paper. There were over twenty fruits in the case, and all were ripe, but, notwithstanding the knocking about they probably received in the course of transit, not a single fruit was even bruised, and the packing-paper was perfectly dry. This by the way.

The following is the paper above-mentioned, and emanates from the Bombay Agricultural Department, the author, Mr. L. B. Kulkarni, L.Ag. The illustrations showing the advantage of thinning out the closely-packed fruits and artificial branching are from the same source:—

"*Carica Papaya* (the Papaw).—This well-known tree has been subjected to ill-merited abuse, described as ugly and everything that is disagreeable, yet it may be questioned if there is a more handsome or generally useful tree in Indian gardens."—Woodrow.

### PROPAGATION.

*Cuttings.*—The only method by which the papaya has so far been propagated is from seeds. Experiments made in the Ganeshkhind Botanical Gardens, Poona, show that vegetative propagation by cuttings

and by grafting is possible. The first experiments were made with five plants about 1 ft. long, which, after being transplanted in July, 1913, became rotten below ground-level owing to the excessive rains of August. These were uprooted and the rotten portion removed, the upper portions being then planted in a pot and placed in a hot frame. Of these, one struck roots in a month and was transplanted outside, but soon died of exposure. After this about a dozen cuttings from fresh wood were taken, and in January, 1914, were planted in the ground, under shade, and treated as usual along with other cuttings. The result was that the cuttings grew pale and rotted below ground. Another attempt was then made in February, 1914, with two dozen cuttings, each about 1 ft. long and ½ in. thick, taken from one-year-old wood of a country variety. One dozen cuttings in pots were placed in hot frames and the other dozen in the ground, under shade. This time the treatment was different. Sand only was used both in pots and outside as a substratum for planting the cuttings. Of those outside, five rotted despite the care taken in watering. Those in the hot frame kept in excellent condition, and only one of them died. They produced new leaves in a month, while those in the ground were found to be slower in growth.

*Grafting.*—In January, 1914, five male plants just flowering were whip-grafted with scions of the andromonœceous type (plants with male and perfect flowers on same trees). The thickness of the scion was equal to that of the stock—*i.e.*, half an inch. Three of these died, and the other two produced new leaves in a month and remained healthy until April, 1914, when one was attacked by insects and the leaves eaten, this graft succumbing in consequence. The second one is now in good condition, with new green leaves. The importance of these results lies chiefly in the fact that it may be possible by using these vegetative means of reproduction to settle conclusively some of the questions regarding the inheritance of sex in the papayas. It is doubtful as yet whether they will be of any special value in the practical cultivation of the plant.

## BRANCHING OF PAPAYA.

Papaya has a supple, thin, straight trunk branching only when its growth is interfered with. When cultivated it attains the height of from 12 to 20 ft. On account of its considerable height difficulties arise in watching and gathering the fruit. The stems are also easily damaged by wind.

To remove these difficulties, experiments were made in the Ganeshkhind Botanical Gardens, Poona, to encourage branching by the removal of tops of the stems about the time of flowering. Accordingly, ten plants were selected in August, 1910, and the tops of five removed to encourage branching. In a fortnight five to six shoots were produced below the wound, only two being encouraged in each case. Fruits were harvested from December, 1912, to the end of March, 1914. No fruits

were obtained from July to December, 1913. The following table shows the outturn of fruits in branched and unbranched plants:—

| BRANCHED. | | | UNBRANCHED. | | |
|---|---|---|---|---|---|
| Plant. | Number of Fruits. | Average Weight in oz. of each Fruit. | Plant. | Number of Fruits. | Average Weight in oz. of each Fruit. |
| 1 .. .. | 45 | 56·8 | 1 .. | 19 | 33·0 |
| 2 .. .. | 32 | 42·0 | 2 .. | 16 | 28·2 |
| 3 .. .. | 30 | 26·6 | 3 .. | 21 | 33·7 |
| 4 .. .. | 61 | 45·9 | 4 .. | 31 | 58·7 |
| 5 .. .. | 23 | 32·0 | 5 .. | 28 | 66·2 |
| | Total .. 191 | 203·3 | .. | 115 | 219·8 |
| | Average 38.2 | 40·65 | .. | 23·0 | 43·96 |

The above table shows that the branched plants gave a greater average number of fruits which were of slightly less average weight. It was observed that the branched plants were less frequently damaged by winds, and the fruit was easy to watch and to harvest. In these circumstances it may be said that the system of branching, if done carefully so as to admit air and light and at the same time to break the force of the wind, will prove most beneficial. In June, 1913, one more plant was operated on with special care. In this case four branches were encouraged—one to each point of the compass. The fruits on each branch were uniform in size and shape and also bigger than the average fruit of other plants. (*See* Fig. 2, Plate 2, page 37, January issue.)

It may be noted, in passing, that Mr. F. B. Kilmer, in his article on "The Story of Papaya,"* states that removing the top of the plant and thereby encouraging more branches and fruit is much more beneficial in cold climates, since the plant is protected from frost, and fruit is produced near the ground.

It is also mentioned, in " Hawaii Agricultural Experiment Station Report for 1911," page 30, that, to get large-sized fruits, it is best to prune off the branches when they first appear.

## THINNING OF PAPAYA FRUITS.

The fruits of the papaya are borne round the stem in such a way that they interfere seriously with each other's growth. It is therefore best to remove a certain number of fruits to allow the rest to develop better.

With this end in view, ten plants in the Ganeshkhind Gardens, Poona, were operated on in September, 1910, one unthinned plant being left for control. The process caused much greater development of the individual fruits. (*See* Fig. 2, Plate 2, page 37, January issue), one being as heavy as 8 lb., and the remainder ranging from 6 to 8 lb. A

* "Jamaica Agricultural Department Bulletin," Vol. I., Part 8.

dealer offered 4 annas each for the thinned fruits. The unthinned tree had many fruits which had crowded and deformed one another. A similar experiment was tried under the writer's advice in a cultivator's field, and the results were equally satisfactory.

In 1912 the experiment was again systematically conducted in the Ganeshkhind Gardens, Poona, twenty plants being selected and labelled "A" and "B." The ten plants labelled "A" were thinned, and the ten plants labelled " B " were left unthinned as controls. The variety used was Ceylon. The following table will show that the average number of fruits from the thinned plants is much less than that of the unthinned, but the average weight is correspondingly greater. The estimate of the money value is based on a small number of fruits only which, when sent to the market, brought the following prices:—

| THINNED. | | | | UNTHINNED. | | | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| Number of Fruits. | Price. | | | Number of Fruits. | Price. | | | |
| | Rs. | As. | P. | | Rs. | As. | P. | |
| 4 ... ... | 0 | 5 | 0 | 3 ... ... | 0 | 2 | 9 | |
| 6 ... ... | 0 | 3 | 6 | 16 ... ... | 0 | 13 | 0 | |
| ... | | ... | | 5 ... ... | 0 | 3 | 0 | |
| 10 ... ... | 0 | 8 | 6 | 24 ... ... | 1 | 2 | 9 | |
| The average price per fruit comes to 10·2 pies. | | | | The average price per fruit is 9·3 pies. | | | | |

| A.—THINNED. | | | | B.—UNTHINNED. | | |
|---|---|---|---|---|---|---|
| Plants. | Number of Fruits Removed. | Fruits Obtained. | Average Weight of each Fruit in oz. | Plant. | Fruits Obtained. | Average Weight in oz. |
| 1 ... ... | 12 | 6 | 39·3 | 1 ... | 20 | 37·2 |
| 2 ... ... | 15 | 11 | 34·0 | 2 ... | 23 | 31·5 |
| 3 ... ... | 16 | 7 | 48·2 | 3 ... | 11 | 30·5 |
| 4 ... ... | 16 | 8 | 54·0 | 4 ... | 15 | 35·8 |
| 5 ... ... | 23 | 9 | 47·7 | 5 ... | 14 | 36·1 |
| 6 ... ... | 10 | 7 | 43·0 | 6 ... | 14 | 38·7 |
| 7 ... ... | 11 | 6 | 36·8 | 7 ... | 15 | 36·4 |
| 8 ... ... | 7 | 1 | 27·0 | 8 ... | 28 | 26·9 |
| 9 ... ... | 5 | 4 | 42·0 | 9 ... | 11 | 30·8 |
| 10 ... ... | 13 | 10 | 37·7 | 10 ... | 11 | 24·3 |
| Average ... | 12·8 | 6·9 | 40·9 | ... | 16·2 | 32·8 |

The above results show that the increase of weight is not sufficient to compensate for the loss of fruits in the experiment under consideration. Another experiment gave the following results:—

| Plant. | Fruits Removed. | Fruits Obtained. | Weight. |
|---|---|---|---|
| 1 ... ... ... ... | 5 | 3 | 71·6 oz. |
| 2 ... ... ... ... | 6 | 7 | 65·0 ,, |
| 3 ... ... ... ... | 7 | 3 | 52·3 ,, |

Here the weights are greater but the fruits still fewer.

With a small number of, say, six good fruits per plant the experiment may pay ultimately when run on a large scale, *vide* the "Annual Report of the Government Horticultural Gardens, Lucknow, for 1912," where it is stated that an acre of land carrying 1,000 plants, each producing six to ten fruits after thinning, may give considerable profit to the grower. The difficulty is to hit on exactly the right amount of thinning to get the greatest weight compatible with the greatest number of fruits. This can only be obtained by practice, and in the meantime it is recommended to remove only such fruits as are obviously going to be badly crushed.

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## ORANGE-GROWING IN NORTH QUEENSLAND.

By G. WILLIAMS, Fruit Inspector, Cairns.

The orange (also including mandarin) was originally looked upon as best suited to sub-tropical conditions, but where grown under purely tropical influences it is found that neither vigour nor productiveness are impaired, but very much increased. The general quality of the fruit, except where subject to the influences of excess of moisture, is also decidedly improved. The Northern climate, from Townsville to Cooktown, embraces a wide range of conditions varying from excess of moisture to almost the other extreme, the most humid being included in coastal area from Mourilyan to Port Douglas. Rapid development of the tree is characteristic throughout, but a warm, dry atmosphere being essential to maturing fruit of the best quality, as this is departed from the tendency is toward a "watery" fruit without the keeping qualities of those matured under drier conditions. This is to some extent compensated by fruit in humid districts maturing early in the season and thus commanding ready sale. Under drier influences the crop is very late, extending with ordinary varieties in the Cook district to early November, and when late Valencias come into bearing will probably be extended to late December. The possibilities of orange growing in districts where the fruit matures at this time of year, and also where the injury from scale insects is practically nil once the trees have become established, can readily be appreciated.

It is common belief that orange trees are but short lived, no doubt attributable to planting those worked on inferior stocks or in unsuitable soil. Probably the oldest-worked trees in North are in the vicinity of Cooktown, being upwards of 40 years old, vigorous and productive, with every appearance of continuing to remain so. According to recognised authorities, the orange tribe live to a very great age in a soil and climate that suits them. An orange tree at the convent of St. Sabina, at Rome, was said to be 600 years old. At Nice there was, according to Risso, a tree which generally bore between 5,000 and 6,000 oranges, being quite 50 ft. high with a trunk which required two men to embrace it. The largest tree measured by Mr. Wallace in the Azores was 30 ft. high, the stem being 7 ft. in circumference at the base.

A varying number of trees have in previous years been planted throughout the North, but principally on account of the reasons before mentioned, also inattention, except in odd instances, have not been entirely successful. That previous failures be not repeated careful attention must be given to the following details:—Plant in suitable soil and situation only approved varieties worked on reliable stocks (orange on seedling orange or pomelow, mandarin on seedling mandarin, other than thorny variety), systematically arranged to admit of economic working and least possible hand labour. Maintain vigour by efficient cultivation and irrigation where necessary; and spraying or cyaniding to eradicate on first appearance any trace of disease.

*Suitable soil.*—A free loam of good depth will give best results. In this natural drainage is provided and the constituency best adapted for the maintenance of indispensible regular and even supply of moisture, without which orange growing is more or less a failure. The greater the depth the better will the trees withstand seasons of drought. When overlying an impervious subsoil, drainage is defective and trees are but short-lived, and where subsoil is of a coarse, gravelly nature fertility is lacking. In the absence of essential soil conditions, the trees may remain productive for some years, but the quality of fruit gradually becomes impaired—diminishing in size and containing excess of "rag." Gumming appears amongst the branches, and during the remainder of life the value of crop annually diminishes. Though the orange in suitable soil is a hardy tree, there is no profit attendant upon its cultivation where subject to any kind of hardship, therefore upon the selection of a suitable site for planting ultimate success or failure are almost entirely based.

*Land preparation.*—The most important feature in preparing forest land subsequent to clearing is deep cultivation. Newly cleared scrub land does not admit of general cultivation, but in all cases the soil should be deeply worked beyond the radius to which roots may be expected to extend during the year, and annually increased to meet further requirements. Extra expenditure in this direction will be amply repaid in after growth. Explosives are being largely used for loosening the soil and considered both effective and economical. Shooting by dynamite at a depth from 3 ft. to 5 ft. has a shattering effect for several feet lower and for a corresponding extent sidewise. For loosening the soil throughout an old orchard this is undoubtedly the most effective method, provided the ground has been thoroughly tilled, all roots of perennial weeds, such as couch grass, thoroughly eradicated, and the ground levelled as far as possible or reduced to an even surface, laying off must be considered. For convenience in cultivation, also for the beauty of the orchard, trees should be in straight lines, a measuring wire being most convenient for the purpose. The general practice is to plant in squares, the trees being all at right angles. This is the simplest arrangement and generally held to be the best. Where the land has been properly worked, the holes for the reception of young trees need only be large enough to contain their roots without folding or in

any way cramping them. The suggestion that holes can be dug at any time after laying off the land though it is not desired to plant immediately is not recommended—soil that requires treatment in this manner is best left alone or utilised for some other purpose. In digging holes place the surface soil on one side, and the lower soil on another. The object is to have the top soil to place in direct contact with the roots when the tree is planted; the lower soil being used to complete the refilling.

The distance which should be allowed between trees may vary slightly according to varieties, and also to immediate local conditions, but as a general rule this should not be less than 24 ft. By systematic shortening they may be kept within slightly less limits, but it will be found that the return for a given area will be much in favour of the larger, though fewer, trees. The effect of dry spells is also a consideration, and very noticeable where there is any suspicion of overcrowding. Orange trees, having practically no dormant season, require a much greater amount of moisture than the generality of fruit trees, and where the supply is curtailed the effect is soon manifest upon the foliage.

*Varieties.*—The selection of varieties for planting will depend on local circumstances, also market requirements. Cardwell, Port Douglas, and Cooktown, where late fruit is the object, planting should be mainly confined to late Valencia orange. Where early crops are matured, Washington navel and White Seletta orange, with Emperor mandarin, should have most attention. Some of the more recent varieties of mandarin, possessing a very thin rind, have not been an unqualified success (particularly when on lemon roots) in the more humid parts, but in the drier coast lands they should do well. In tableland districts best fruit of these will no doubt be produced. The threadbare question of seedlings *versus* grafts intrudes in respect of varieties, and the former will always have its advocates. On account of the whole energies of the seedling being devoted for some years (at Naples a seedling was 26 years old before commencing to bloom, and 20 years have been noted in Queensland) to wood production, whilst those of worked trees are largely toward reproduction, the former is less susceptible to hardship in earlier stages. Worked trees are referred to as shorter lived than seedlings—attributable mainly to inattention, and being worked on inferior stock. The influences of stock and scion are apparent equally in the orange as in other trees, a very close analogy being indispensable where a regular and permanent growth is desired. Extremes can be illustrated by working an orange on both thorny mandarin and rough lemon. The medium will be found when a seedling orange is worked. Many opportunities have been availed of for comparison of worked trees, grown under precisely similar conditions in different parts of the North, and in every instance where planting has exceeded twelve years (in many cases much less), the disadvantage is very plainly with the lemon and citron stock. A disadvantage frequently applicable to seedling trees is irregularity in cropping compared with worked varieties.

The season or time of planting when trees are only procurable from Southern nurseries is confined to colder months. For Northern planting this is a drawback, being followed by the drier parts of the year, and growth, instead of being stimulated, is more likely to become stunted. Locally-grown trees are best transplanted on approach of wet season, when everything is favourable to their becoming established before advent of dry conditions. In the absence of Northern supplies, it is thus an advantage for planters as far as possible to grow their own young trees. Seeds planted closely in shallow boxes about 6 in. deep and filled with fine soil to within an inch of the top will develop plants 3 or 4 in. high in a few months. These can be planted in rows 3 ft. apart with 6 in. between plants and by July will be sufficiently advanced for grafting, which, if successful, will admit of young trees being planted in permanent positions if so desired during the following February. Grafting is recommended for the amateur in preference to budding, though the latter has the advantage of being applicable at different times of the year.

*Planting and training.*—On no account plant below the level of surrounding surface or so that the original ground level of tree will sink below that plane. It is very much preferable to err on the other side, the roots will extend downwards where necessary, but the base of stem is a fixture and will remain where placed unless forcibly moved. Nursery stock is not unfrequently trained to a long bare stem terminating in a bunch of small branches. Such samples should be cut back to within 18 in. or less of the ground level—in fact, all trees other than those reared in pots should be well shortened at planting, four or five shoots which are to form the main branches being allowed to start at regular intervals. A little extra attention in the early stage and first two years' growth will, by the removal of surplus and misplaced shoots, not only remove the necessity of later amputation of larger branches, but by directing the growth into permanent channels assist in the earlier development of the tree. No hard-and-fast rules can be followed for pruning young trees, but misplaced shoots should be removed in earliest stages by a sharp knife and cut close in to the base, thus removing any adventitious buds which the practice of rubbing off with finger and thumb allows to remain to become a perpetual source of trouble, and the formation of unsightly callus. The orange being exceedingly susceptible to injury by exposure of its roots, for this reason the handling of young trees must be such as to allow a minimum of exposure. They should not be allowed to become dry under any conditions, and the application of water at planting should be as soon after insertion as possible.

As growth progresses, attention to early training should result in an evenly balanced tree, well developed but not crowded, though some attention to shortening long flexible shoots or such as have a tendency to excessive vigour may be necessary. The Emperor mandarin has a habit of producing long upright shoots, whilst a vigorous Washington navel when untrained adopts a weeping habit. To counteract both influences, shortening is the only effective system. If allowed to grow

unchecked, the slender branches of mandarin cannot support the weight of fruit, and are either bent into unsightly shape or broken at the forks in consequence. The navel will have branches bearing upon each other, the lower ones trailing upon the ground. In no case should trees be trained with long bare stems, nor with extremities of lower branches at a great distance from the ground. In addition to the advantages of collecting the fruit, spraying, &c., a low-set tree affords a shade for the ground and, what is of much importance in a hot climate, protects the stem from direct rays of sun. Trees so trained are much less liable to injury by heavy winds.

*Cultivation.*—That an efficient state of cultivation should be maintained amongst trees is generally admitted, but the perceptions of actual requirements vary from the requisite to the extreme of indifference. To maintain the land free from weeds throughout the year is in many places impracticable, but there is no occasion to allow perennial weeds, of which couch grass is here the most persistent, to obtain a footing, much less to assume control.

Some diversity of opinion exists in regard to the necessity of or frequency for ploughing between the trees. In districts where rainfall is fairly continuous during the wet season, ploughing is indispensable, and the most satisfactory method of disposing of the crop of annual weeds which appears at this time. The frequent use of disc cultivator will dispense of much of the necessity at other periods, for it must be recognised that one of the most active agencies for the exhaustion of moisture from the subsoil is the growth of weeds. Although under cover of rank vegetation moisture may appear at the surface, and convey the impression of conserving it in the soil, while the moisture in the lower layers is reduced and the trees robbed of their supply. Consequently weed growth should be resolutely suppressed throughout the dry months. The cultivator is also the most useful implement for maintaining the surface soil in the best possible condition, it being essential to maintain a disturbed layer of loose earth over the entire surface, the pulverisation of which must be so complete that capilliarity is destroyed. In a hot climate at least 5 in. to 6 in. is not by any means excessive. If but roughly broken up in the form of coarse clods the air has free access to the upper surface of soil beneath them and evaporation proceeds, though in a somewhat less degree, as if cultivation were absent.

*Manuring.*—To apply heavy dressings of manure about young trees, particularly at the time of planting, is decidedly more harmful than beneficial. After the trees have become established and commenced to bear, systematic fertilising becomes necessary. Overmanuring, particularly with organic substances, has practically the same effect as excessive moisture either by natural agency or irrigation. In this case the absorption appears to be too great for the transpiration, and the heavier the nature of soil the more will ill effects be shown by the tree.

*Renovation* of an orchard in which cultivation and attention has been neglected is an unpleasant task, but unfortunately there is ample

scope for practice. Parasitic growths, decay, and not infrequently disease are often present. To commence operations by merely working the land and eradicating weeds would be very slow in effect. Trees so situated should be severely headed back by at least two-thirds of the length of branches, all diseased and decayed parts being cut clean away; in fact, nothing but the stumps of main branches remaining as a base for the formation of a new head. The land thoroughly worked, preferably with disc implement. Surface roots will be destroyed by this means, which is rather desirable, as they only serve to keep the tree supplied with nutriment during wet weather, and for a short subsequent time. The foliage being removed relieves the principal strain, and aided by cultivation both root and branch growth are stimulated, and with the loss of but a season's crop of inferior fruit new life is infused throughout—judicious thinning of young shoots will be necessary—preferably after the first growth—far more will appear than space can permit to develop. Where trees have been planted too closely and have exceeded the allotted space shortening the branches in a more moderate degree should be annually practised. Developed trees which for any reason may be classed as inferior or unprofitable can be transformed into desirable kinds by budding over—a much more expeditious method than replanting. The usual practice, also the most reliable, is to severely head back the tree whilst dormant, as recommended in dealing with neglected orchards, thus forcing out new shoots which are thinned out as they appear, leaving only such as required to form a shapely tree when budded. The system of inserting buds beneath the bark on old branches is adaptable to moderately young trees, but where they are of large size, with thick branches, results are not nearly so satisfactory as with the previous method, though having the advantage of time in the process of recovery.

*Diseases.*—Northern part of the State is no freer in assortment of injurious pests than other parts, but in respect of scale insects the coastal orchards have generally little or nothing to complain of. In several districts, where either spraying or cyaniding are totally unknown, fruit is marketed in appearance as clean as from the best appointed orchard, due entirely to the agency of parasitic fungi destoying the scale on both tree and fruit before the latter reaches maturity. In others but an occasional application is necessary to keep these pests in subjection. The innumerable presence on new growth of young trees of black aphis is sometimes a source of trouble, detrimentally affecting the growth where allowed to remain unchecked. The various diseases and remedies applicable are detailed in pamphlet, "Destruction of Fruit and Vegetable Pests."

The most serious fungoid pests are those responsible for the "black spot" of fruit so prevalent in Cardwell district, and the widely distributed gumming or die-back of branches, and not infrequently the whole tree. Spraying with Bordeaux mixture has been recommended as a preventive against the former, but better results can be anticipated from Burgundy mixture, on account of its being more adhesive. Similar

applications are credited with influence against the malady of die-back, but extended observations carry the conviction that a suitable soil of consistency not subject to extremes of drought and moisture, efficient cultivation, cover all the preventive requirements.

*Interculture.*—Undoubtedly a handicap militating against the rapid extension of planting is the length of time which must elapse before an orchard is self-supporting. This under favourable conditions may be put down at about five years. To reduce the strain on finances during that term, interculture is resorted to, dwarf growing crops being grown amongst, but not within reach of roots of young trees, until the latter attain a profitable stage. The system has its advantages, also disadvantages, but the fact of a margin being available after paying for cultivation and keeping the land clean outweighs any other consideration. Various crops are adapted for the purpose, and none of tall growing habits such as maize should be included. Peanuts, potatoes, and other crops which remain but a short time in the ground are preferable, though even pineapples may be grown to advantage. It stands to reason that the fertility so absorbed from the soil must be artificially restored.

A common error has been to plant a larger area than can conveniently be looked after, consequently being all round unsatisfactory. The vigour of trees is affected and the quality of fruit far short of what it should be. The same expense is incurred in gathering, casing, freight, and incidental charges, fruit of inferior quality as where the best only is produced. It will be admitted that growing second grade or inferior fruit is unprofitable. The amount of labour and attention required for five acres of trees will vary slightly in different districts, but in any case a similar occupation of time, necessary for a given area, when applied to double the extent will reduce the returns upwards of 50 per cent. A reasonable extent of orchard, well worked and cared for, is a source of pleasure as well as profit to the owner, but where more is included than can well be managed these phases are apt to entirely disappear.

## A CHEAP WHITEWASH.

The Department of Agriculture of New South Wales recommends the following as a cheap whitewash which will stand the rain and weather without coming off, and will do for galvanised iron:—Place enough tallow required for the purpose in a large bucket, then lay about the same quantity of good lime (dry) on top of the tallow—*i.e.*, equal proportions of each; then pour enough water on to slake the lime. When the heat from the lime has melted the tallow, and all is well dissolved, stir it thoroughly until all is well mixed; then apply (warm, if possible) with a large brush. This will do for any surface. The surface must be quite dry before applying the mixture. If required to dry very white, add a small quantity of blue.

# Tropical Industries.

## NOTES ON TOBACCO CULTURE—No. 2.

BY NICHOLAS SACHOULIS, Turkish Cigarette Tobacco Grower and Expert, Inglewood.

### TOPPING.

When the tobacco plants come to maturity and the proper number of leaves can be secured, do not wait for the bloom.

Topping is a matter of judgment, and the number of leaves left varies with each plant, and is determined by the vigour of the plants, the character of the season, and the purpose for which the crop is being grown. If too many leaves are left, they will be coarse. Err in the direction of leaving too many. Additional leaves can be removed later if necessary. Late rain and new growth often render plants coarse that otherwise were correctly topped. Leave from twelve to fourteen leaves on the plants when the soil and season are good.

### PRIMING.

That is, taking off the bottom leaves. This can be done at the same time as topping is being performed. Three to four leaves should be taken off, as well as all leaves that are damaged. This gives the remaining leaves the full benefit of plant life.

### SUCKERING.

Remove all suckers and sprouts as often as they appear. These should not be allowed to remain on the plants, but must be broken off as soon as they are from 2 to 4 in. long. If they are not removed they will rob the leaves of their strength, and thin, gumless, papery leaves will be the result. The plants should be gone over two or three times during the ripening season, as both the maturity of the plant and the texture of the leaf depend upon this suckering being well and faithfully done. The above is necessary in order to have the field ripen evenly, and also to get a good quality and quantity.

### PREPARATION.

Have knives, sticks, poles, twine, needles, barns, and labour well in advance of the season. An important matter for the tobacco-grower is not to overcrop himself, and to know that twelve or fourteen leaves give more pounds and a better product, with less labour. Neglect in this particular means badly handled tobacco and loss of time and money.

### CAUTION.

Do not cling too closely to any particular practice. Methods must vary with the season and condition, but the methods must be based on the principles underlying the growth of the tobacco plant and the production of good tobacco. Unless you know what is required, and what

any particular method will accomplish, you are working in the dark. If tobacco could be grown anywhere and everywhere, it would have no value. A business that gives so good a return cannot be left to chance. Do not be misled into thinking that you will achieve a high degree of success from the beginning, for it takes some years to adapt methods to conditions. In a future paper I will deal with harvesting and curing tobacco.

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF DECEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING DECEMBER, 1913 AND 1914, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|
| | Dec. | No. of Years' Records. | Dec., 1914. | Dec., 1913. |
| *North Coast.* | In. | | In. | In. |
| Atherton ... ... | 7·19 | 13 | 3·86 | 8·59 |
| Cairns ... ... | 7·60 | 27 | 4·09 | 10·76 |
| Cardwell ... ... | 8·78 | 27 | 3·58 | 7·41 |
| Cooktown ... ... | 6·06 | 27 | 6·50 | 16·56 |
| Herberton ... ... | 5·29 | 27 | 3·67 | 5·49 |
| Ingham ... ... | 6·36 | 22 | 1·75 | 7·51 |
| Innisfail ... ... | 12·39 | 27 | 2·78 | 7·46 |
| Mossman ... ... | 11·55 | 5 | 5·40 | 19·92 |
| Townsville ... ... | 5·34 | 30 | 4·26 | 6·72 |
| *Central Coast.* | | | | |
| Ayr ... ... ... | 3·65 | 27 | 2·92 | 9·18 |
| Bowen ... ... | 3·75 | 27 | 5·61 | 5·71 |
| Charters Towers ... | 3·08 | 27 | 4·80 | 4·44 |
| Mackay ... ... | 6·69 | 27 | 3·44 | 15·59 |
| Proserpine ... ... | 7·77 | 11 | 7·99 | 12·30 |
| St. Lawrence ... | 3·91 | 27 | 4·67 | 8·09 |
| *South Coast.* | | | | |
| Crohamhurst ... | 7·08 | 22 | 5·77 | 4·45 |
| Biggenden ... ... | 5·11 | 14 | 1·80 | 4·81 |
| Bundaberg ... ... | 4·52 | 27 | 2·13 | 5·22 |
| Brisbane ... ... | 5·07 | 63 | 4·93 | 2·37 |
| Childers ... ... | 5·44 | 19 | 2·30 | 3·77 |
| Esk ... ... ... | 4·45 | 27 | 3·92 | 3·77 |
| Gayndah ... ... | 4·06 | 27 | 4·17 | 5·78 |
| Gympie ... ... | 6·48 | 27 | 2·52 | 3·23 |
| Glasshouse M'tains | 7·41 | 6 | 7·22 | 2·82 |
| Kilkivan ... ... | 4·46 | 27 | 1·25 | 4·55 |
| Maryborough ... | 4·40 | 27 | 1·89 | 6·24 |

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|
| | Dec. | No. of Years' Records. | Dec., 1914. | Dec., 1913. |
| *South Coast*—continued: | In. | | In. | In. |
| Nanango ... ... | 3·57 | 27 | 3·67 | 3·01 |
| Rockhampton ... | 4·39 | 27 | 5·07 | 13·40 |
| Woodford ... ... | 5·44 | 27 | 4·02 | 3·67 |
| Yandina ... ... | 6·89 | 21 | 4·81 | 5·22 |
| *Darling Downs.* | | | | |
| Dalby ... ... | 3·23 | 27 | 2·80 | 1·35 |
| Emu Vale ... ... | 3·19 | 17 | 7·38 | 3·92 |
| Jimbour ... ... | 3·45 | 24 | 2·46 | 1·73 |
| Miles ... ... | 2·70 | 27 | 0·97 | 2·73 |
| Stanthorpe ... | 3·44 | 27 | 3·00 | 1·57 |
| Toowoomba ... | 4·10 | 27 | 7·89 | 1·93 |
| Warwick ... ... | 3·46 | 27 | 3·07 | 3·70 |
| *Maranoa.* | | | | |
| Roma ... ... | 2·57 | 25 | 2·65 | 2·28 |
| *State Farms, &c.* | | | | |
| Gatton College ... | 3·18 | 14 | 7·66 | 2·83 |
| Gindie ... ... | 2·76 | 13 | 0·64 | 5·04 |
| Kamerunga Nurs'y | 5·94 | 23 | 5·71 | 13·59 |
| Kairi ... ... | ... | ... | 3·65 | 7·79 |
| Sugar Experiment Station, Mackay | 7·92 | 16 | 2·47 | 14·21 |
| Bungeworgorai ... | ... | ... | 2·77 | 1·67 |
| Warren ... ... | ... | ... | 3·77 | 5·02 |
| Hermitage ... | 2·12 | 7 | 3·68 | 4·36 |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for December this year and for the same period of 1913, having been compiled from telegraphic reports, are subject to revision.

# Entomology.

## NUT GRASS-DESTROYING COCCID AND ITS MITIGATION.

By H. TRYON, Government Entomologist and Vegetable Pathologist.

The advocacy of the use of the insect referred to in the June number of the "Queensland Agricultural Journal" for destroying nut-grass is inconsistent with the attitude towards this so-called "Mealy Bug" (*Antonina purpurea*) and its employment in this work already announced in one of my annual reports.

In fact, knowing that all the species of *Antonina,* that have been described, were associated with one or more members of the Grass tribe, that includes such economic plants as sugar-cane, maize, and wheat, and other cereals, I originally suggested that the species now under consideration—*Antonina purpurea australis*—also was, and, until I could ascertain that is was not, refrained from countenancing its dissemination. This attitude was taken apart from question as to its usefulness as a nut-grass destroyer.

Since the time referred to, I have found the insect associated with buffalo grass and with one of our native Gramineæ as well, feeding on both, and so, for the present, I must discountenance the method of coping with nut-grass that involves resort to it.

With regard to locality whence it may be procured, I may mention an estate in the Bundaberg district—a sugar farm in the Woongarra Scrub area, formerly owned by Miss Tanner but lately occupied by Mr. Lane Nott. I would suggest that Mr. Oelrich's latter query be submitted to the Director of the Botanic Gardens. The success there in coping with nut-grass is a matter of common knowledge.

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## THE SUGAR-CANE BUD MOTH.

(*LOXOSTOMA* SP., FAM. TINEIDAE.)

By EDMUND JARVIS, Entomologist.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following article on the Sugar-cane Bud Moth from Mr. E. Jarvis, Acting Entomologist to the Bureau:—

### INTRODUCTORY.

Although of little economic importance, this insect occasionally proves injurious to seed cane, the caterpillars sometimes destroying as much as 80 per cent. of eyes in soft varieties like "Clark's Seedling" (H.Q. 426).

In addition to direct injuries of this nature they feed on the leaf-sheath, gnaw the surface of the rind close to buds, and frequently bore

into cane stalks, thus producing various wounds that court invasion from fungus diseases.

Owing to secluded habits and the insignificant size of both larva and adult a moderate infestation may easily remain unnoticed in the field, especially when affecting varieties of hard cane. "Badila" is freely attacked at Gordonvale, but injuries appear to be confined principally to the epidermis of the rind in the immediate vicinity of nodes, and to softer basal portions of the leaf-sheath and arrow.

The insect responsible for this damage belongs to the family Tineidæ and is related to our common clothes moths. I am indebted to Dr. A. J. Turner, of Brisbane, for its identification as a species of the genus Loxostoma. He is inclined to think that it may have been previously described as an exotic moth.

It is probably related to *Ereunetis flavistriata,* Wlsm., which is said to occur quite numerously at times throughout Hawaiian canefields, and to occasion a good deal of loss by destroying the buds of soft varieties desired for cuttings.

A species of Tineidæ is recorded also from Porto Rico attacking the eyes and bases of young cane shoots, thereby affecting the stand of the latter, but is not plentiful, and apparently of local occurrence.

## LARVA.

*Habits.*—The caterpillars are usually more or less in evidence during stripping or loading operations, being forced at such times to explore the surface of defoliated canes in search of congenial hiding-places.

Like other species of Tineidæ, they are active when touched, and able to crawl either forward or backward with equal facility.

When thoroughly alarmed the larva wriggles convulsively and seeks safety by dropping into the air suspended on a thread of silk, or as a last resource falls to the ground and hides under débris.

*Appearance.*—Body translucent; general colour pinkisk-yellow. Head dark reddish-brown with several rather long yellow hairs. Prothoracic segment smooth and shining, pale-yellow shading to brown on posterior half, which constitutes a collar extending nearly to spiracles, and with a darker brown plate on each side on spiracular area forming a continuation of the dorsal collar but separated from it. Meso and metathoracic segments each with 10 large yellowish-brown blotches of unequal size above spiracles, and a narrow transverse blotch between spiracles and legs. Abdominal segments with four small dark spots arranged in subdorsal lines extending the length of body, and four spots on each side grouped around spiracles. Ventral area of first, second, and last three abdominal segments with a transverse row of about 8 smaller spots. The blotches on thoracic segments bear two yellow hairs and abdominal spots a single hair. Anal segment terminated by a light brownish-yellow semicircular patch bearing 8 long yellow hairs. Length of body, 16 mm. (about 5/8 of an inch).

## PUPA.

*Situation.*—Pupation takes place under a silken covering previously spun by the larva and completely hidden under pellets of its excreta ingeniously fastened to the outside. It is usually concealed between the leaf-sheath and cane-stalk and attached near the base of the former or more rarely to rind close to a node. The moth before emerging works the pupa partly out of its cocoon-like covering, leaving half of the broken pupal shell protruding from one end.

*Appearance.*—Light yellow suffused with reddish on dorsal surface. Abdominal segments each with a transverse ridge near anterior margin surmounted by dark-brown spines. Ventral surface light yellow except on head-end and anal segment, which are clouded with reddish, darkening towards extremities. Legs and antennæ distinctly outlined in light red, the latter meeting centrally on fifth and sixth segments and projecting slightly beyond wings. Top of head prolonged into a somewhat conical cap terminating ventrally in a short sharp spine (*see* Figs. C1 and D). Eyes black. Anal segment provided with two short dark-red curved spines situated dorsally and directed upwards as illustrated in Figs. C2 and E.

NOTE.—The pupa when removed from its case invariably rests with the end of abdomen incurved towards centro-ventral line as depicted in photo at Fig. C2. Length of pupa, 7·80 mm.; length of pupal case, 11 mm. (nearly half an inch).

## MOTH.

*Description.*—Female: Fore-wings ochreous-yellow with an elongate purple blotch at base on costa and a large blotch of same colour on apical margin. Hind-wings pale yellow speckled with gray; fringes light shining yellow. First few joints of antennæ, upper surface of prothorax, and top of head thickly clothed with purple scales, which viewed with an ordinary pocket lens are seen to flash with metallic crimson tints. A sort of comb-like ruff of these beautiful scales occurs in front of the head, and they are scattered also over a portion of the blotches on fore-wings. Abdomen golden shaded with iridescent light green. Hind femora densely covered with long yellow hairs. Wing expanse, 16 mm.; length of body, 6·40 mm. (about ¼ of an inch).

*Habits.*—The moth rests by day in a conspicuous position on leaves of sugar-cane, &c., with its wings enfolding the body and antennæ laid flat on the surface, projecting straight in front of its head in parallel lines that appear to emerge from the sides of the thorax, this deception being due to a curious disposition of the large, movable, first antennal joint, which is scape-like and directed obliquely to each side of the head (*see* Fig. G).

It most likely oviposits on the rind between stem and leaf-sheath, a position that affords safe harbour for the future larvæ, which are generally found in this situation during all stages of growth.

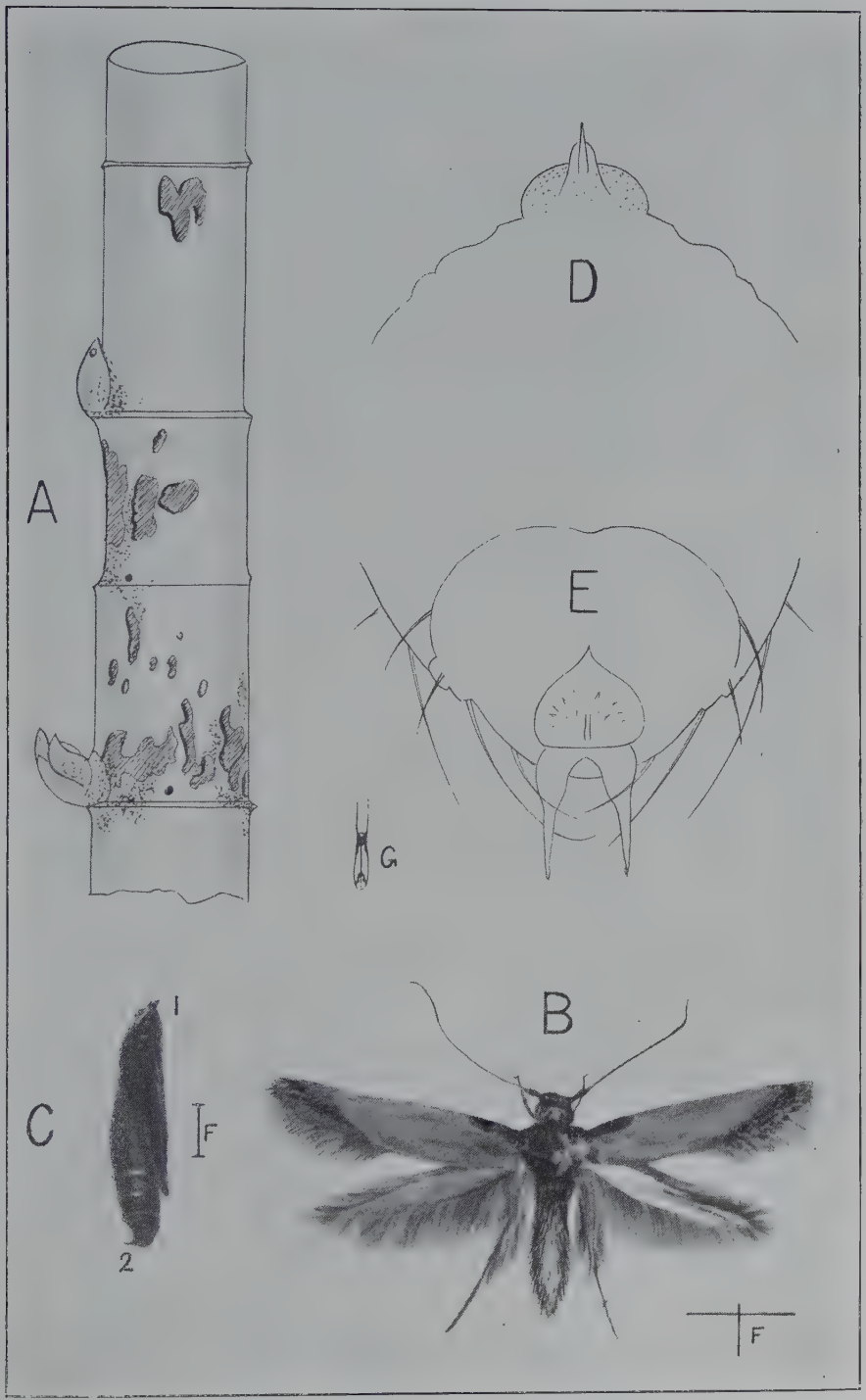


PLATE 4.

A—Diagrammatic sketch of damaged cane-stalk.
B—Bud moth (*Loxostoma* sp.), magnified five times.
C—Pupa of bud moth, magnified five times.
D—Ventral view of head of pupa at C1, highly magnified.
E—Extremity of anal segment at C2, as seen when pupa lies on its back with end of abdomen turned up.
F F G—Natural size.

## CONTROL.

*Natural Control.*—Larvæ of this moth are probably attacked by parasitic hymenoptera, but up to the present none have been bred from the scanty material collected.

A small earwig and two or more brightly coloured cockroaches of arboreal habits occurring plentifully on cane plants are most likely predaceous foes, their flattened form allowing them to easily crawl between the stem and base of leaf-sheath in search of prey. The common English earwig has been observed devouring pupal of a small moth that destroys parsnip seed. I confined specimens of our sugar-cane cockroaches and earwig with bud-moth caterpillars, as a test, and after twenty-four hours found that both insects had eaten the larvæ placed with them. Such results, however, cannot be regarded as conclusive evidence of carnivorous habits until confirmed by further experiments carried out under natural conditions.

*Artificial Control.*—Fortunately this pest, although evidently widely distributed in Queensland, is of minor importance, and does not call for remedial action unless affecting cane-cuttings of soft varieties intended for seed. It is, of course, desirable to prevent as far as possible the introduction of such infected cane into districts brought under sugar for the first time.

Cuttings of choice varieties grown exclusively for seed should be immersed in Bordeaux mixture solution for one hour before being planted, to ensure destruction of any larvæ that might be present and minimise chances of injury from cane fungi.

This method of disinfection is not only simple and inexpensive, but, in addition to its insecticidal and fungicidal value, has been found to promote better germination and also increase the final yield.

Whilst experimenting last December in connection with the control of scarabæid cane-beetles I was pleased to find that artificial light had an attraction for this moth.

Burning trash as soon as practicable is to some extent a controlling factor, as pupation occurs mostly on the leaf-sheath; moreover, large numbers of the moths would be unable to escape from the suffocating smoke of a big fire.

Avoid growing bananas close to sugar-cane, as the former happens to be a favourite food-plant, its succulent leaf-stalks affording a super-abundance of nourishment to larvæ of this pest.

# General Notes.

## WAR AND WOOD PULP.

On the serious question of the world's paper supply, the "Times Literary Supplement" says:—

"It is not only in its effect upon the reading public that the war is keeping the book trade in its present state of suspended animation. The question of the paper supply is obviously a very serious one, when so much of the raw material for books comes from abroad in the shape of wood pulp and esparto. Esparto, a grass from the shores of Spain and Northern Africa, preceded wood as a substitute for rag when the supply of that material proved insufficient to meet the increasing needs of the book market. To-day, some 100,000 tons of esparto are imported into England, chiefly for this purpose, esparto being especially to the manufacture of book paper. The war will cause the paper-maker to turn his attention more closely than ever to the discovery of other sources of supply. Wood is not an inexhaustible material. The demand for pulp has increased so vastly that it is now estimated to account for the destruction of something like 50,000,000 trees every year. According to Mr. R. W. Sindall, who has made investigations in this connection on behalf of the Indian Government, the more likely substitute for esparto grass and wood pulp is bamboo; but experiments are being made with fibrous stock of every description. Meantime, the price of paper has gone up, and one of the largest manufacturers of the book trade recently stated that, unless fresh supplies of material and chemicals were forthcoming, his works would be temporarily shut down before the end of the month. The increase in the price of paper in the book world will naturally fall heaviest of all upon the cheap reprints, especially when these are issued by British houses for Continental editions."

The "South African Mining Journal" of 12th September, 1914, in an article on "Paper-making in South Africa," states that a certain grass called "Tambuti" or "Tambookie" (*Cympogon validus*) grows in great profusion in Natal, the low veldt of the Transvaal, and other parts of the Union, and the idea of utilising this grass for the purpose of paper-making is no new one. The possibilities of that question have often been speculated on, but nothing definite has hitherto been arrived at. A sample of tambuti grass was recently submitted to the Department of Customs and Excise, at the Imperial Institute, and the report which has just been received is distinctly encouraging.

The sample of grass weighed 12 lb., and consisted of lengths up to about 5 ft. 6 in.; the stems measured about one-sixth inch in diameter at the base. A chemical examination of the grass gave the following results, and the corresponding figures for Algerian esparto grass (which

is at present largely used in paper-making) are included for the purpose of comparison:—

| | Tambuti Grass. Per Cent. | Esparto Grass. Per Cent. |
|---|---|---|
| Moisture (on drying at 100°–110° C.) .. .. .. | 10·2 | 8·8 |
| Ash (expressed on dry material) .. .. .. | 7·4 | 3·0 |
| Yield of unbleached pulp (dried at 100°–110° C.)— | | |
| (1) Expressed on material (air dry material) .. | 37·1 | 29·5 |
| (2) Expressed on material (dried at 100°–110° C.) | 41·3 | 32·3 |
| Loss on weight of pulp on bleaching .. .. | 3·1 | 1·3 |
| Yield of bleached pulp (dried at 100°–110° C.) expressed on original material dried at 100°–110° C. | 40·0 | 32·0 |
| Length of ultimate fibres in inches .. .. | 0·012 to 0·188<br>0·081 | 0·012 to 0·12<br>0·045 |

The report says that, on heating with caustic soda solution under pressure, the tambuti grass was readily converted into a light fawn coloured pulp, which was very easily bleached to a pure white product. It will be noticed that the yield of pulp is unusually high, whilst the average length of the ultimate fibres is considerably greater than in the case of the esparto grass. Paper-making trials carried out at the Imperial Institute showed that a satisfactory paper of fairly good strength could be prepared from the tambuti pulp, and specimens of both the bleached and unbleached product have been received by the Department of Customs and Excise. The report concludes—"The high yield of pulp of good quality, and the ease with which the pulp is bleached, show that the tambuti grass is well adapted for paper-making, and the crude material would probably be worth about £4 per ton in the United Kingdom. It would, however, probably be more remunerative to convert the grass into 'half-stuff' in South Africa, and either ship this 'half-stuff' to Europe or utilise it locally for the manufacture of paper."

## KILLING DESTRUCTIVE BIRDS.

### OPERATIONS IN NEW SOUTH WALES—EFFECTIVE POISONING.

The real seriousness of the parrot pest in New South Wales is now realised, and the time has arrived when some very decisive move must be made by fruitgrowers to cope with it. Too many growers have had the heart-breaking experience of seeing all the good work put into their orchards in pruning, spraying, and cultivating go for nothing, save to feed hungry droves of parrots, which, in a few weeks, either ate out or rendered the harvest unfit for market.

The birds are much too cunning to be long put off by the old-fashioned scarecrows, and in a few days will so far overcome their first fears as to alight upon the very apparition itself. Shooting, either with shot guns or pea rifles, has proved inadequate and far too costly, consequently attention has been turned to poisoning as the ultimate solution of the problem. Amongst those who have achieved success in dealing with the pest is Mr. Philip Sommerlad, of Spring Valley, Tenterfield (an enthusiastic reader of "The Fruit World"), and his well-thought-out methods have been followed by such conspicuously good results that

the facts deserve to be made known. Mr. Sommerlad has for many years favoured strychnine poisoning as the most effective remedy, and during the past season showed conclusively enough that if growers could be induced to take united action the pest could be wiped out at a trifling cost.

His method of working is simple (writes the "Sydney Daily Telegraph"). He makes use of the fact that the birds are essentially gregarious in their habits, and invariably confine their operations to certain picked trees of a variety of apple or pear that suits their taste. As the parrots in question are by nature honey-suckers, and are therefore fitted with a tongue adapted for extracting the sweetness out of fruit or flower, they may be relied upon to select a sweet apple, and upon such a tree or row of trees they will concentrate in hundreds, and, if left undisturbed, will eat the crop out to a finish.

Mr. Sommerlad chooses one or more of the best of such trees—preferably in different parts of the orchard. He first picks the apples, whether sound or partly eaten. He then takes a good number—say half a case—of attractive, firm, juicy apples, and, with a packing needle, runs a string through them individually from stem to calyx, leaving a couple of inches protruding at either end. With a pen-knife he makes an incision in the side of the fruit (more than one if the fruit be large), inserting the blade almost to the core, and giving it a turn so as to take out a "plug," a little less than half an inch across. Into the hole thus made a small quantity of powdered strychnine is placed, about as much as will stay on the point of the knife-blade. (A reversed pen-nib will be found to meet the case.) The "plug" is then reinserted, and the apples are allowed to stand for at least twelve hours, by which time the peculiarly solvent juice of the apple has dissolved the strychnine and distributed it throughout the fruit.

To hang the bait in the chosen tree is the next step. For this purpose, nothing is found to answer better than a bough from a bush tree, such as a stringybark, which is then mounted on a pole so as to be well above the foliage of the apple-tree. This is preferable to hanging the fruit on the tree itself, inasmuch as parrots invariably alight on the topmost part of a tree and work downwards. The boughs are also portable, and, should the parrots shift their quarters to another part of the orchard, can easily be removed to the spot. The best plan is to place a number of boughs in different parts of the orchard. It is scarcely necessary to say that every care must be taken to warn persons going into the orchard. Poultry should also be kept at a distance, though little fruit falls from the boughs, on account of its being tied on. All that is now necessary is to place a couple of decoy birds in a cage in the tree, and the parrots can be left to their own devices.

The poison is exceedingly quick in action, and within ten minutes or so from the time they commence to eat the birds will begin to drop. Many fly away as soon as poison pangs seize them, and may be found in all parts of the orchard, as well as in the bush around and in neigh-

bouring orchards. Poisoned birds have been picked up in orchards 5 miles and more away. This fact makes it impossible to compute definitely the extent of the destruction, but enough evidence can be gathered from the known results to show that the method is exceedingly effective.

As the poisoned fruit is eaten, more is put up, and the work may be continued almost indefinitely while the birds continue to give trouble. During the past season, Mr. Sommerlad used poison on 20 days, and 2,571 dead birds were picked up, but this does not indicate by half the number killed. The biggest total for any one day was 430 dead birds.

In addition, the method is found to be very effective for flying foxes, who, like the parrots, alight on the highest point of the tree and work down. Many of these also fly away to die, but Mr. Sommerlad gathered about 200 in his orchard while poisoning was in progress. Tallies of twenty in a night were frequent. The cost of the above work, excluding the value of the fruit used and the small amount of time taken, was 11s. No apparatus of any kind needs to be purchased, the first, last, and only expense being the strychnine itself.

In view of these facts, it is obvious that only concerted action on the part of growers in districts affected is necessary to so diminish the birds that their ravages will be neither here nor there. But while some remain sceptical and others are indifferent, the odd enterprising orchardists in the district are placed at a great disadvantage. By clubbing together and purchasing the necessary strychnine in bulk lots, a great saving could also be effected in the cost of the poison. Mr. Sommerlad's method, which has been arrived at after years of observation and experience, has proved itself cheap and sufficient, and its wholesale adoption could not but be followed by the most satisfactory results to the fruit industry.—"Fruit World."

## MANURE FOR LUCERNE.

One hundredweight bonedust, 6 cwt. superphosphate, and 3 cwt. sulphate of potash. This should be applied at the rate of 2 cwt. per acre.

## ERRATA.

In the table containing the analysis of the sheep dipped during the dipping experiments at Gindie State Farm, published in the January issue of the Journal, two obvious errors occur. It is made to appear that out of 50 sheep dipped, 81 were fly-blown, and the number on the back and ear is also given at 81. In both cases the numbers should have been 11.

# Answers to Correspondents.

## PACKING EGGS FOR COLD STORAGE.

If eggs in cold storage are packed in chaff, the latter is likely to "sweat," causing discolouration of the eggs, and giving them a somewhat musty flavour. It would be much better to pack in the ordinary cardboard fillers, but even these are apt to become damp in cold storage.

## RHEUMATISM AND KIDNEY DISEASE IN SWINE.

For the treatment of these ailments, the Government Veterinary Surgeon, Mr. McGown, recommends:—

"If rheumatism is the cause of trouble, the animals should be kept warm and dry. Soft, nourishing food with 4 grains of iodide of potassium should be given twice daily. In the case of kidney worms, 2 drachms of oil of turpentine in half a pint of milk will prove beneficial."

## BANANA CULTURE.

E.B.C., Gympie—

Mr. C. Ross, Instructor in Fruit Culture, advises that the Cavendish and Ladies' Finger varieties are the most suitable for your locality, but no variety will stand much frost. So far, Gros Michels have not been the success that was anticipated—this or any other variety will not stand six successive frosts. September and October are the best months to plant, although the work may be done all through the summer. Banana suckers might be obtained from any of the Chatsworth banana-growers.

## TO GET RID OF BLACK ANTS.

"Blackfellow," Tara—

The best substance for destroying black ants is corrosive sublimate. Carpet rag strings dipped in it and fastened round the blocks will cause them to leave at once. It is said that if a tree or house block be smoothed to a width of about 6 or 7 in., and this space well rubbed with chalk, the ants will be absolutely prevented from climbing. They seem to entirely lose their footing, those below the ring being unable to climb, and those above it falling the instant they set foot on the chalk. The chalk should be removed from time to time.

Other remedies are: Washing with a solution of ammonia, washing with carbolic soap, and pouring gasoline into their nests. Make the following mixture:—White lime (slaked), 6 quarts; kerosene oil, ½ pint; turpentine, 1 wine-glass; soft soap, 5 lb.; cowdung, 3 quarts; water, 16 quarts. With this wash the blocks or trees.

None of these remedies are permanent, but will require repeating often.

## DISEASED UDDER.

The affection of the udder, as described by a correspondent, is not infectious, but may be transmitted by inoculation. Therefore, the milker should wash his hands thoroughly before touching another cow. The udder should be well fomented with warm water, and the wounds dressed with powdered boracic acid.

## HIP DOWN AND STRINGHALT.

"BUSHMAN"—

Hip down is the result of an accident. When it is first noticed, the animal should be placed in slings and a stiff blister applied to the affected part. Great care should be exercised in keeping the animal quiet and also to keep the sling from rubbing the animal's hide into sores. In such a case as this, it usually takes from six to eight weeks before the bones are thoroughly united.

Stringhalt is a nervous disease for which there is no remedy.

## HORSE WITH ENLARGED WITHER.

A correspondent at Gin Gin lately brought under the notice of the Stock Department the case of a horse with a greatly enlarged wither, which, however, he says is not a fistula, since when pierced with a knife to a depth of 2 in. no bleeding occurs.

Mr. A. H. Cory, Chief Veterinary Surgeon, says that, according to the symptoms described, the trouble appears to be a local form of poisoning, probably of the lymphatics, the exact nature of which cannot be stated. He suggests giving the horse 6 drachms of aloes as a ball or in the form of a drench mixed in 1 pint of water. After this has acted, give 2 drachms of potassium iodide once daily for ten or twelve days in a bran mash. Well rub the swollen parts with a solution of iodine once daily; 1 part of tincture of iodine to 4 parts of water.

## DEATH OF COWS FROM EATING MUSSEL SHELLS.

Mr. F. G. Collins, stock inspector, Maryborough, having been informed that a cow belonging to a resident of Toogoon had died from some unknown cause, paid the owner a visit and made a *post-mortem* examination of the animal. He found that the first stomach contained a quantity of broken-up mussel shells. As all the organs were healthy, except considerable inflammation of the stomach, he was of opinion that the shell was the cause of death. The want of lime causes cattle to eat shells and bones. The matter being referred to Mr. McGown, Government Veterinary Surgeon, he advised: "As there seems to be a deficiency of lime in the soil, I would advise the following lick for cattle affected:—Bonemeal, 1 lb.; carbonate of iron, 4 oz.; gentian, 4 oz.; common salt, 8 oz.; fenugreek, 4 oz. Mix thoroughly together, and allow 1 tablespoonful with each feed."

## COW WITH BLIGHT.

With reference to a question by a correspondent as to the remedy for an eye affection in a cow, Mr. McGown, Government Veterinary Surgeon, says that the animal is suffering from blight, and recommends that the eye be painted twice daily with the following solution:—Sulphate of zinc, 5 gr.; water, 6 oz.

If this treatment has not the desired effect, the following solution should be used as above:—Nitrate of silver, 5 gr.; distilled water, 1 oz.

## FILLY WOUNDED BY BARBED WIRE.

The wound in the knee-cap as described should be thoroughly washed with a solution of carbolic acid and water—1 to 20—and afterwards dressed by placing a pad of antiseptic lint over the wound, which should be kept in position by a bandage. When the wound has healed from the bottom, the following powder should be dusted on to the surface:—Powdered boracic acid, 6 parts; iodoform, 1 part. Mr. McGown, Government Veterinary Surgeon, does not think that anything will reduce the thickening of the knee which has taken place, but exercise may prevent any further swelling.

## THEORY OF WATER-FINDING.

The only literature we know of on this subject is a small book published in 1892 by B. T. Barton, printer, Farnworth, Lancashire, England. The author was B. Tompkins, who was most successful in finding water in many parts of England. He was, possibly still is, a farmer living on Pipsmore Farm, Chippenham, Wiltshire. It would appear that the faculty of water-finding must be inherited and cannot be acquired. Seeing a diviner at work is the best way of acquiring information. Many people unknown to themselves possess the faculty, and only discover this when instructed by a water-finder.

## FEEDING STUD RAMS.

A. J. S., Montrose—

If you have no roughage—that is, pasturage—for your rams, a good ration is made by allowing from 4 to 5 lb. of good oaten or lucerne chaff per diem, with the addition of about 1 lb. of grain (oats, maize, peas, or barley, whichever is most easily obtainable). If the animals have not had access to salt, the addition of about one-quarter of an ounce of salt to the ration will be beneficial. With dry rations such as this, a plentiful supply of good drinking water should be available. With rough pasturage, the chaff may be lessened by one-half, but the grain ration (1 lb.) kept up. The object of feeding rams should be to keep them in good working condition and not allowing them to get too fat. Excessive fatness militates against their value in no small degree.

## LUMP ON COW'S JAW.

J. H., Emu Park—

This cow seems to be suffering from actinomycosis. Mr. McGown, Government Veterinary Surgeon, recommends that the lump be painted three times a week with tincture of iodine. Two drachms of iodide of potassium should be given morning and night in a bucket of water.

## SCRUB TIMBER FOR FENCE POSTS, &c.

Ironbark and bloodwood (forest timbers) are, of course, the best timbers for the purpose. But some scrub timbers will last a long time and others decay quickly. An excellent preservative for any kind of scrub or other timber is the following:—Mix together, to the consistency of paint, boiled linseed oil and powdered wood charcoal. Apply two coats before fixing in the ground. The results are excellent, the timber so treated being rendered practically indestructible.

## EGG-EATING HENS.

F. J. TURNER, Dangarfield, Yeulba—

There are only two remedies for egg-eating. One is, to empty an egg by blowing out the contents. Then, through the larger hole at one end, fill with egg and breadcrumbs and saturate this with spirits of ammonia. The egg-eaters will rush for it, but a single peck is usually enough. Inveterate egg-eaters have been cured by this. If the bird is not a valuable one, fatten it and kill it. If valuable, and the eggs are required for hatching, cut the upper beak with a sharp knife till it is tender and signs of bleeding appear. This will not prevent the bird from picking up its food, and the beak will grow again.

## DRYING-OFF A COW.

The usual method of drying-off a dairy cow is to gradually reduce the number of milkings, commencing by milking the animal once daily for a short period, then extending the interval between the times of milking by milking the beast once in two or three days until ultimately the flow of milk has practically ceased. Occasionally there is considerable difficulty in bringing about the required reduction in the column of the flow of milk, particularly when the animal has access to abundant and succulent pastures, and in such cases it is advisable to diminish the supply of food, either by turning the cow out into a scantily grassed enclosure or restricting her to the stockyard for several hours each day. Care must be exercised in drying-off a dairy cow, otherwise, upon freshening, the cow will be found to have one or more of the quarters of her udder permanently damaged, the injury being attributable to turning the beast out into a grazing paddock before the flow of milk was sufficiently reduced.

## TREATMENT FOR MAMMITIS IN COWS.

In the case of cows suffering from mammitis, the udder should be fomented morning and night with warm water for an hour at a time, and the following liniment rubbed into the affected part when dry:—Soap liniment and belladonna liniment, equal parts; 1 lb. Epsom salts should be given so as to reduce fever.

## WARTS ON YOUNG STOCK.

Warts must be forcibly removed, dressings being of little or no avail. In many cases, the fingers are sufficient to remove them, but in other cases a pair of pincers, or a ligature of cord tied round them, may be essential. After extraction the wounds should be treated daily with some antiseptic, such as lysol, Condy's, &c.

## BLIND TEATS.

There are several causes for blind teats, but, provided milk is in the quarter, the teat, or milk duct, must be cleared by passing a milk syphon once or twice daily until the teat is clear. Before using the syphon, it should be placed in boiling water for ten minutes to sterilise it, otherwise dirt and various organisms are introduced by the syphon, which may produce serious consequences.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JANUARY, 1915.

| Article. | | JANUARY. Prices. |
|---|---|---|
| Bacon | lb. | 8d. to 10½d. |
| Bran | ton | £9 10s. |
| Butter | cwt. | 118s. |
| Chaff, Mixed | ton | £5 |
| Chaff, Oaten | „ | £6 10s. |
| Chaff, Lucerne | „ | £6 |
| Chaff, Wheaten | „ | £6 to £6 5s. |
| Cheese | lb. | 6d. to 7d. |
| Flour | ton | £13 |
| Hams | lb. | 1s. 2d. to 1s. 3½d. |
| Hay, Oaten (Victorian) | ton | £9 to £9 10s. |
| Hay, Lucerne (Prime) | „ | £5 |
| Honey | lb. | 2½d. |
| Maize | bush. | 4s. 2d to 4s. 3d. |
| Oats | „ | 4s. 6d. |
| Onions | ton | £13 to £14 10s. |
| Peanuts | lb. | 3½d. |
| Pollard | ton | £10 |
| Potatoes | „ | £12 to £12 10s. |
| Potatoes (Sweet) | cwt. | 2s. 6d. to 3s. |
| Pumpkins | ton | £2 10s. to £4 |
| Wheat, Milling | bush. | 5s. 6d |
| Eggs | doz. | 7½d. to 1s. 5d. |
| Fowls | pair | 4s. to 5s. 9d. |
| Geese | „ | 7s. to 8s. 6d. |
| Ducks, English | „ | 3s. 3d. to 3s. 9d. |
| Ducks, Muscovy | „ | 4s. 6d. to 6s. 3d. |
| Turkeys (Hens) | „ | 7s. to 9s. 3d. |
| Turkeys (Gobblers) | „ | 18s. to 22s. 6d. |

## SOUTHERN FRUIT MARKETS.

| Article. | JANUARY. Prices. |
|---|---|
| Bananas (Queensland), per case | 9s. to 12s. |
| Bananas (Fiji), per case | 18s. to 20s. |
| Bananas (G.M.), per case | 22s. to 24s. |
| Mandarins (Queensland), per case | ... |
| Mangoes, per case | 6s. to 7s. |
| Oranges (Navel), per case | ... |
| Oranges (Seville), per case | ... |
| Oranges (other), per case | 8s. to 13s. |
| Passion Fruit, per half-case | 5s. to 9s. |
| Papaw Apples, per half-case | 7s. to 10s. |
| Pineapples (Queens), per case | 11s. to 15s. |
| Pineapples (Ripleys), per case | 5s. to 8s. |
| Pineapples (Common), per case | 5s. to 8s. |
| Tomatoes, per quarter-case | 3s. to 4s. 6d. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | JANUARY. Prices. |
|---|---|
| Apples (American), Eating, per case | 12s. to 13s. |
| Apples (Local), per case | 4s. to 8s. 6d. |
| Apples Cooking, per case | 4s. to 6s. |
| Apricots, per quarter-case | 3s. to 5s. |
| Bananas (Cavendish), per dozen | 1d. to 1½d. |
| Bananas (Sugar), per dozen | 1¼d. to 2d. |
| Cape Gooseberries, per quarter-case | ... |
| Cherries, per quarter-case | 4s. 6d. to 7s. 6d. |
| Cocoanuts, per sack | 12s. to 15s. |
| Cumquats, per case | ... |
| Custard Apples, per quarter-case | ... |
| Lemons, per case | 6s. to 8s. 6d. |
| Lemons (Italian), per case | 10s. to 15s. |
| Limes, per case | ... |
| Mandarins, per case | 7s. to 8s. |
| Mangoes, per case | 6s. to 7s. |
| Nectarines, per quarter-case | 2s. 6d. to 4s. 6d. |
| Oranges (Navel), per case | ... |
| Oranges (other), per case | 15s. to 20s. |
| Papaw Apples, per quarter-case | 1s. 6d. to 3s. |
| Passion Fruit, per case | 3s. to 5s. |
| Peaches, per quarter-case | 2s. to 5s. 6d. |
| Peanuts, per pound | 3½d. |
| Pears, per case | 4s. to 8s. 6d. |
| Persimmons, per quarter-case | ... |
| Pineapples (Ripley), per dozen | 5s. to 8s. |
| Pineapples (Rough), per dozen | 1s. to 2s. 6d. |
| Pineapples (Smooth), per dozen | 2s. to 5s. |
| Plums, per case | 2s. to 4s. |
| Rockmelons, per dozen | 7s. to 8s. |
| Rosellas, per sugar bag | ... |
| Strawberries, per tray | ... |
| Strawberries, per dozen boxes | ... |
| Tomatoes, per quarter-case | 1s. to 2s. 6d. |
| Watermelons, per dozen | 4s. to 12s. |

## TOP PRICES, ENOGGERA YARDS, DECEMBER, 1914.

| Animal. | DECEMBER. Prices. |
|---|---|
| Bullocks | £12 7s. 6d. to £15 15s. |
| Cows | £9 7s. 6d. to £11 12s. 6d. |
| Merino Wethers | 23s. |
| Crossbred Wethers | 25s. 6d. |
| Merino Ewes | 21s. 6d. |
| Crossbred Ewes | 22s. 3d. |
| Lambs | 21s. 3d. |
| Pigs (Bacon) | 59s. |
| Pigs (Porkers) | 37s. |

# TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

| Date. | JANUARY. | | FEBRUARY. | | MARCH. | | APRIL. | |
|---|---|---|---|---|---|---|---|---|
| | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 4·57 | 6·45 | 5·22 | 6·42 | 5·41 | 6·20 | 5·58 | 5·46 |
| 2 | 4·57 | 6·45 | 5 22 | 6·42 | 5·42 | 6·19 | 5·58 | 5·45 |
| 3 | 4·58 | 6·46 | 5·23 | 6·41 | 5·43 | 6·18 | 5·59 | 5·44 |
| 4 | 4 58 | 6·46 | 5·23 | 6·41 | 5·44 | 6·17 | 5·59 | 5·43 |
| 5 | 4 59 | 6·47 | 5·24 | 6·40 | 5·45 | 6·15 | 6·0 | 5·42 |
| 6 | 4 59 | 6·47 | 5·24 | 6·40 | 5·45 | 6·14 | 6·0 | 5·41 |
| 7 | 5·0 | 6·47 | 5·25 | 6·39 | 5·45 | 6·13 | 6·1 | 5·40 |
| 8 | 5·1 | 6·47 | 5·26 | 6·38 | 5·46 | 6·12 | 6·1 | 5·39 |
| 9 | 5·2 | 6·47 | 5·27 | 6·37 | 5·46 | 6·11 | 6·2 | 5·38 |
| 10 | 5·3 | 6·47 | 5·28 | 6·36 | 5·47 | 6·10 | 6·2 | 5·37 |
| 11 | 5·3 | 6·47 | 5·29 | 6·36 | 5·47 | 6·9 | 6·3 | 5·36 |
| 12 | 5·4 | 6·47 | 5·30 | 6·35 | 5·48 | 6·8 | 6·4 | 5·34 |
| 13 | 5·5 | 6·47 | 5·30 | 6·34 | 5·48 | 6·7 | 6·4 | 5·34 |
| 14 | 5·6 | 6·47 | 5·31 | 6·34 | 5·49 | 6·6 | 6·4 | 5·33 |
| 15 | 5·7 | 6·47 | 5·32 | 6·33 | 5·49 | 6·5 | 6·5 | 5·32 |
| 16 | 5·8 | 6·47 | 5·33 | 6·32 | 5·50 | 6·4 | 6·5 | 5·31 |
| 17 | 5·9 | 6·47 | 5·34 | 6·31 | 5·50 | 6·3 | 6·6 | 5·30 |
| 18 | 5·10 | 6·47 | 5·34 | 6·30 | 5·51 | 6·2 | 6·6 | 5·29 |
| 19 | 5·11 | 6·46 | 5·35 | 6·29 | 5·52 | 6·0 | 6·7 | 5·28 |
| 20 | 5·12 | 6·46 | 5·36 | 6·28 | 5·53 | 5·59 | 6·8 | 5·27 |
| 21 | 5·12 | 6·46 | 5·36 | 6·28 | 5·53 | 5·58 | 6·8 | 5·26 |
| 22 | 5·13 | 6·45 | 5·37 | 6·27 | 5·53 | 5·57 | 6·9 | 5·25 |
| 23 | 5·14 | 6·45 | 5 37 | 6·26 | 5·54 | 5·56 | 6·9 | 5·24 |
| 24 | 5·15 | 6·45 | 5·37 | 6·25 | 5·54 | 5·55 | 6·10 | 5·23 |
| 25 | 5·16 | 6·44 | 5·38 | 6·24 | 5 54 | 5·54 | 6·10 | 5·22 |
| 26 | 5·16 | 6·44 | 5·38 | 6·23 | 5·55 | 5·53 | 6·11 | 5·21 |
| 27 | 5·17 | 6·44 | 5·39 | 6·22 | 5·55 | 5 52 | 6·11 | 5·20 |
| 28 | 5·18 | 6·44 | 5·40 | 6·21 | 5·56 | 5·51 | 6·12 | 5 20 |
| 29 | 5·19 | 6·43 | ... | ... | 5·56 | 5·50 | 6·12 | 5·19 |
| 30 | 5 20 | 6·43 | ... | ... | 5·57 | 5·49 | 6·13 | 5·18 |
| 31 | 5·21 | 6·43 | ... | ... | 5·58 | 5·48 | ... | ... |

## PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 1 Jan. | ○ | Full Moon | 10 | 20 | p.m. |
| 9 „ | ☽ | Last Quarter | 7 | 12 | a.m. |
| 16 „ | ● | New Moon | 12 | 41 | „ |
| 23 „ | ☾ | First Quarter | 3 | 32 | p.m. |
| 31 „ | ○ | Full Moon | 2 | 41 | „ |

The moon will be brightest, under favourable atmospheric conditions, when in the last quarter, as it will then be nearer to the earth.

| | | | | | |
|---|---|---|---|---|---|
| 7 Feb. | ☽ | Last Quarter | 3 | 11 | p.m. |
| 14 „ | ● | New Moon | 2 | 31 | „ |
| 22 „ | ☾ | First Quarter | 12 | 58 | „ |

There will be no actual Full Phase this month, two having occurred in January. The moon will be nearest to earth on 7th February at 11·18 p.m.

| | | | | | |
|---|---|---|---|---|---|
| 2 Mar. | ○ | Full Moon | 4 | 32 | a.m. |
| 8 „ | ☽ | Last Quarter | 10 | 27 | p.m. |
| 16 „ | ● | New Moon | 5 | 42 | a.m. |
| 24 „ | ☾ | First Quarter | 8 | 48 | „ |
| 31 „ | ○ | Full Moon | 3 | 38 | p.m. |

The moon will be nearest the earth on the 5th at 1 p.m., and farthest from the earth on the 21st at 11·12 a.m. The moon's distance from the earth at these times will be about 225,000 miles, and about 252,000 miles, respectively.

| | | | | | |
|---|---|---|---|---|---|
| 7 Apr. | ☽ | Last Quarter | 6 | 12 | a.m. |
| 14 „ | ● | New Moon | 9 | 36 | p.m. |
| 23 „ | ☾ | First Quarter | 1 | 39 | a.m. |
| 30 „ | ○ | Full Moon | 12 | 19 | „ |

The moon will be in perigee, or nearest to the earth, on the 2nd at 9·36 a.m., and on the 30th at 5·12 p.m. It will be in apogee, or farthest from the earth, on the 18th at 1 36 a.m.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

# Farm and Garden Notes for March.

Field.—Take every opportunity of turning up the ground in readiness for sowing and planting winter crops. The main crop of potatoes should at once be planted. As the growth of weeds will now be slackening off, lucerne may be sown on deeply cultivated soil. The latter should be rich and friable, with a porous subsoil. The land should be thoroughly pulverised. Do not waste time and money in trying to grow lucerne on land with a stiff clay subsoil. Prepare the land a couple of months before sowing, care being taken to cross plough and harrow before the weeds have gone to seed. This ensures a clean field. Sow either broadcast or in drills. In the former case, 20 lb. of seed will be required; in the latter, 10 lb. A good stand of lucerne has been obtained with less quantities. Lucerne seed is worth from £5 10s. to £6 10s. per cwt. Should weeds make their appearance before the plants have sent down their tap roots, mow the field. Before they can again make headway enough to do any damage, the lucerne will be strong enough to hold its own against them. Harrow and roll the land after mowing. Gather all ripe corn. It is now too late to sow maize, even 90 Day, with any certainty of harvesting a crop of grain. Rye grass, prairie grass, oats, barley (in some districts, wheat), sorghum, vetches, carrots, mangolds, and Swede turnips may be sown. In Northern Queensland, sow tobacco seed, cowpea, carob beans, sweet potatoes, opium poppy, &c Sow anatto, jack fruit, and plant kola-nut cuttings. Some temperate-zone vegetables may be planted, such as egg plant, potatoes, &c. Coffee-planting may be continued. Harvest kafir corn and paddy.

Flower Garden.—Now is the time to plant out bulbs. A complete garden could be furnished with these charming plants, which are to be had in every colour and variety. Amongst the many are—Amaryllis, anemone, arum, babiana, crinum, crocus, freesia, ranunculus, jonquils, iris, ixias, gladiolus, narcissus, Jacobean lilies, tigridia, tritonia.

All bulbs like well-drained, somewhat sandy soil, with a plentiful admixture of leaf mould. Herbaceous plants and annuals which it is intended to raise from seed should be sown this month. Such are antirrhinums (snapdragon), asters, cornflowers, dianthus, larkspurs, daisies, cosmea, candytuft, lupins, gaillardias, godetia, mignonette, poppies, pansies, phlox, sweet peas. Cannas now planted will require plenty of food in the shape of liquid manure. Put in cuttings of carnations. Chrysanthemums require attention in the way of disbudding, staking, watering with liquid manure, &c. Growers for exhibition will thin out to a few buds and protect the flowers from rain and sun. Dahlias should be looking well. To secure fine blooms, disbudding should be done.

Now, as to climbers which may now be planted. These are—*Allamanda Schotii* (beautiful yellow), *Antigonon leptopus,* a charming

cerise-coloured climber; *Aristolochia elegans,* handsome as an orchid and easily grown; *Aristolochia ornithocephala* (Dutchman's Pipe), very curious, large, always attracts attention; *Asparagus plumosa,* grows in any shady place; *Beaumontia grandiflora,* splendid white flower, grand for a fence, will grow 50 ft. high; Bignonias of several kinds; Bougainvilleas, with their splendid leafy pink and purple flowers, rapidly clothe a fence or unsightly shed with a blaze of blossom; *Quisqualis indica,* a fine creeper, flowers pink, changing to white; Wistaria, purple and white. Most beautiful is the *Bauhinia scandens,* rarely seen about Brisbane. We grew a plant of this climber at Nundah, and it soon closed in the front of the veranda for a distance of over 80 ft. The leaves are very small, and in the flowering season it presents almost a solid mass of beautiful round bunches of blossoms, something like the hawthorn bloom —pink and white. It seeds freely, but the seeds are difficult to germinate, and when they have produced a plant it is still more difficult to rear it. A rooted sucker from the main stem will in all probability grow.

KITCHEN GARDEN.—During this month a very large variety of vegetable seeds may be sown in readiness for planting out where necessary in the autumn, which begins on the 20th of March. All unoccupied land should be roughly dug, and, where required, add well-decomposed manure. Transplant cabbage, cauliflower, celery, &c. Sow French beans, beet, carrot, turnips, radish, cabbage, cauliflower, cress, peas, mustard, &c. Former sowings should be thinned out and kept clear of weeds. Mulch round melon and cucumber beds with a good dressing of long stable manure, as it assists in keeping the fruit clean and free from damp. Cucumbers, melons, French beans, and tomatoes should be looked for every day and gathered, whether required or not, for, if left on the vines to perfect their seeds, the plants will soon cease to be productive, or will form inferior, ill-shaped, and hence unsaleable fruit.

# Orchard Notes for March.

## THE SOUTHERN COAST DISTRICTS.

The marketing of the main crop of pineapples will continue to occupy the attention of growers; and as it is probable that the plantations have been allowed to get somewhat dirty during the previous month, they should be cleaned up as soon as ever the crop has been got off. The fruit of the new crop of citrus fruit will be showing signs of ripening towards the end of the month; and as the fruit during this period of its growth is very liable to the attack of insect pests of various kinds, it is important that steps should be taken to prevent loss arising from this cause as far as possible.

Large sucking moths of several kinds attack the fruit as soon as it shows signs of ripening; and as they always select the first fruit that

shows signs of colouring, it is a good plan to gather a few forward fruit and to ripen them up quickly by placing them on a barn floor, and covering them up with bags or straw. They will turn colour in a few days, and develop the characteristic scent of the ripening fruit. The fruit so treated should be hung up in conspicuous places in the orchard as trap-fruit, as not only will it attract the moths, but also the fruit-flies. The moths will be found clustered round the trap-fruits in large numbers, and can then be easily caught and destroyed. Fruit-fly will also puncture such fruit; and if the fruit is destroyed before the larvæ reach maturity, a later crop of these insects is prevented from hatching out. Fruit flies may also be caught in large numbers by means of such artificially ripened fruits. The fruits are smeared with tanglefoot, and hung about the orchard. The fly, attracted by the colour, settles on the fruit, and is caught in a similar manner to house-flies on specially prepared sticky paper. These simple remedies, if carefully carried out, will result in the destruction of large numbers of sucking moths and fruit flies.

The yellow peach-moth that does such damage to peaches in Spring, and that attacks corn, sorghum, cotton bolls, custard apples, and many other plants and fruits, often does a lot of damage to citrus fruits. It acts in a very similar manner to the second and later generations of the Codling moth of pomaceous fruits, in that it lays its eggs where two fruits touch, under the shelter of a leaf on the fruit, at the stem end of the fruit, and, in the case of navel oranges, in the navel itself; in fact, anywhere that there is a likelihood of the egg not being disturbed. The egg hatches out into a small spotted caterpillar, which eats its way into the fruit, causing it to ripen prematurely, and fall off. Where two fruits touch, it often eats into and destroys both, and it frequently leaves one fruit to go and destroy a second. It is a very difficult insect to deal with, owing to the number of fruits and plants on which it lives; but, as far as citrus fruits are concerned, the best remedy is undoubtedly to spray the fruit with a remedy that will destroy the young insect when it starts to eat the skin of the fruit. Bordeaux mixture has been found efficacious, but I am of opinion that spraying with Paris green and lime, Kedzie's mixture, or arsenite of lead, will also have good results. The latter poison is, in my opinion, well worth giving a thorough test, as it sticks to the fruit and leaves for a long time. Bordeaux mixture, either alone or in conjunction with Paris green or Kedzie's mixture, is, however, a good remedy, as not only will it destroy the larvæ or prevent the moth from attacking the tree, but it is also the best remedy for black brand or melanose, as well as tending to keep all other fungus pests in check. Fight fruit fly systematically—both by means of the sticky fruit already recommended and by gathering all fly-infested fruit, such as guavas, late mangoes, kumquats, &c., as well as any oranges or mandarins that may have been infested, as if kept in check now there will be little loss throughout the season. A little fruit will be marketed towards the end of the month. See that it is gathered and sweated for seven days before marketing, and don't gather it too immature. Beauty of Glen Retreat mandarins are often gathered and marketed as soon as they show signs

of colouring. They are then as sour as a lemon, and anyone who is unlucky enough to buy them will steer off mandarins for some time to come. This variety should not be gathered till thoroughly ripe, as when marketed in an immature state it spoils the market, as it puts people off eating citrus fruit.

Clean up the orchard after the summer rains, and have everything ready for the marketing of the crop. See that there is a good supply of clean, dry, case timber on hand, as one of the greatest sources of loss in shipment is packing fruit in green cases.

Strawberry planting can be done throughout the month. Plant such berries as Federation on the lowest ground, and Aurie, Anetta, Trollop's Victoria, Glenfield Beauty on warm, well-drained soils. Prepare the land thoroughly, so that it is in perfect tilth, and in a fit state to retain moisture well; as on this, as much as anything, the success of the crop depends. Where new orchards are to be planted, get the land ready—not the clearing, which should have been done months ago, but the working of the land, as it is advisable to get it thoroughly sweetened before putting the trees in.

## THE TROPICAL COAST DISTRICTS.

The Notes for February apply equally to March. See that bananas are netted—keep down weed growth, and market any sound citrus fruits. Clean up the orchards as well as possible, and keep pines clean. Get land ready where new orchards are to be set out, as tree-planting can be done during April and May. Pines and bananas can still be planted, as they will become well established before winter.

## THE SOUTHERN AND CENTRAL TABLELANDS.

Finish the gathering of the later varieties of deciduous fruits, as well as grapes. Clean up the orchard, and get ready for winter. Get new land ready for planting; and where there are old, dead, or useless trees to be removed, dig them out and leave the ground to sweeten, so that when a new tree is planted to replace them the ground will be in good order.

In the drier parts, where citrus trees are grown, keep the land well worked, and water where necessary.

QUEENSLAND AGRICULTURAL JOURNAL

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# Agriculture.

## NATAL WATTLE-BARK INDUSTRY.

Mr. W. Wayne, senr., writing to the "South African Mining Journal," says:—

Owing to the disturbed conditions now prevailing in Europe, the above industry has been practically brought to a standstill, on account of the wattle-bark buyer having centred this industry in Hamburg, Germany. Under these circumstances, the stripping of the wattle-trees during the present spring season will have to be delayed in consequence of the export market being closed. Last year's exports of wattle-bark totalled some 65,000 tons, which at a low average of £4 10s. per ton equals £292,500 deferred payment to the Natal wattle-growers for the season 1914 based on the 1913 returns. It has occurred to me to lay before you the forenamed loss, for the season 1914, with a view to calling the wattle-growers' attention to the necessity of forming themselves into a limited liability company for the purpose of raising capital to establish wattle-bark extraction factories in convenient centres of the Natal wattle-growing district. These factories would produce the tannin extracts in the right condition for British farmers' requirements. We find the British market object to handle the wattle-bark in its present exported condition as supplied to the Hamburg merchants. I observe, published in the "British South African Gazette," that tenders are being called for wattle extract plants. This journal states that the purchase of a plant costing £20,000 for manufacturing wattle

extract is to be taken in hand by a company formed for the purpose at Pietermaritzburg, Natal. The plant should be capable of dealing with 6,000 tons of raw material annually. Basing the provisional calculation on the above amount of £20,000 being capable of treating 6,000 tons, of raw bark, the present output of bark would require ten factories to treat the year 1913 quantity of bark. Ten factories at £20,000 each equals £200,000. Two hundred thousand pounds capital is required to manufacture their product into a marketable article suitable to British requirements. This would obviate the expense of long railage charges to the coast ports, and it would save the shipping expenses in bulk form to the port of Hamburg. The means of raising the capital for this object might possibly be secured on the following plan being adopted by all those engaged in the wattle industry:—(1) That for every acre of land under wattles the owner should guarantee to subscribe £1 or more to the company, such guaranteed amount to be deducted from the value of his wattle-bark returns when settlement was made; (2) the guaranteed amount could be extended over a period of one or more years, according to the discretion of the board of directors; (3) the capital being raised under the above guarantee would in course of time be returned to the original lenders, and in the meantime gradually bring a co-operative wattle-growers' manufacturers' extract company into permanent existence, and thus help to establish a profitable business for their growing industry. The present position in which the wattle-growers and buyers are placed to-day is one that requires every assistance to overcome this serious loss to those engaged in this industry. The present moment appears one favourable to proposing the flotation of these ten companies for this purpose, which should prove valuable to all concerned and of future benefit to the trade of the country. As a subscriber to your journal, I forward the above views on the wattle-growers' prospects for the year 1914."

"Durban, 5th September, 1914."

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## FODDER SUPPLIES FOR DAIRY STOCK.

Relative to providing fodder supplies for dairy stock, Mr. E. Graham, Dairy Expert, writes:—

The conservation of fodder by means of a silo would materially assist in providing the dairy stock with a ration of suitable food during winter months, or other period when the land is denuded of natural pastures, for it is known that silage properly cured, and prepared from an approved crop, constitutes the basis of a nourishing and succulent meal for the dairy cow.

Of the green crops to be recommended for winter feeding it is considered that field peas associated with skinless barley, cape barley, rye, and oats may provide the best rotation of crop.

The various crops would be ready for use in the order named if given equal opportunity for growth.

About half a bushel of field peas and one and three-quarters bushel either oats or barley to each acre should be planted, and the above quantity of field pea to one bushel of rye to the acre, is suggested.

Relative to Essex rape, all varieties of rape convey characteristic flavours to milk and cream, and these flavours in the absence of pasteurisation of the milk or cream are difficult of eradication. However, the tainting influence of this fodder is to be somewhat reduced by feeding it to cows immediately the process of milking is completed. The maximum degree of taint in the flavour of the milk occurs when fodders of this nature are fed to the dairy herd prior to or simultaneous with milking operations.

Acreage to be cultivated: An area of 10 to 16 acres is necessary to maintain a herd of fourteen (14) cows; and, naturally, the acreage cannot be definitely determined, as much depends upon the weather conditions prevailing during the time the crops are in the field.

According to the nature of the season the oat crop may or may not be required as green feed for the dairy stock, and should it be found that there is a surplus of green fodder on hand at the termination of the feeding season, the oat crop could, under such circumstances, be converted into hay, thereby avoiding any waste.

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## EXPLOSIVES ON THE LAND.

Mr. B. Stirling, of Mount Morgan, writing of his experience in the use of gelignite for blowing out stumps, says:—

"Having read a good deal in the Journal about clearing land, I give my experience with gelignite. Having some land which at one time teamsters used for a road, and was very hard, I decided to clear it of stumps, so I got a grubber and started digging. It took me two hours to get one stump out, so I decided to try gelignite. I can do more in two shots than I could in two days' work at grubbing, and those two shots would take me twenty minutes to bore, charge, and fire for very large stumps. To save gelignite, I blow the earth out from both sides, using two plugs for each side. The stump is generally cleared of earth to a depth of 3 ft., and very often so shattered as to be all ready to set fire to; the small stumps I have blown out with from one to three plugs of gelignite, thus getting rid of small stumps and saving very often ten plugs of gelignite, which would be required if the large stumps were blown out, and bringing the cost of clearing down very low, and, what is more, saving a lot of hard work at grubbing.

"For boring I use a 1-in. auger, 3 ft. long, with a brace at end for boring rapidly. I generally bore to a depth of 18 in., and very often only 12 in. for small stumps—under the stump, if possible; if not, then close to it. After boring out I ram the bottom of the hole firmly with a round wooden banister I use for a tamping rod. Then, if I decide to use three plugs, I break each plug in half, then press each half firmly until squashed solidly in the bottom of the hole. In the last half plug I place the cap with about 12 or 18 in. of fuse, according to the depth of the hole.

I then drop in fine earth, a little at a time, and press that down very gently until the hole is filled up. I next split the fuse, and place a little gelignite in the split and light it. It is wonderful how quickly and easily stumps can be blown out, and how quickly ground, even with green timber on it, is got ready for cultivation with no exhausting work.

"Let anyone in doubt take on grubbing for one day; then shoot out stumps next day. He will see the difference between hard work one day and a week's work done on the next day with gelignite by just boring a few holes and charging and firing."

Many people are afraid of explosives, but they are not half as dangerous, providing care is taken, as some think.

## MARKET GARDENING.

### CAULIFLOWER AND CELERY.

If it is desired to lift and store these vegetables on account of severe weather, or to cultivate the soil in preparation for the next crop, they may be lifted with as much soil as will cling to their roots, and be stacked upright in a cool shed to which light is admitted. The plants should be packed close together and the exposed side should be banked up with soil. In this way they will keep as long as in the open ground. The proper time to lift is about the end of October or during November for cauliflowers, and the middle of November for celery.

# State Farms.

### NOTES FROM KAMERUNGA STATE NURSERY, DECEMBER, 1914.

Rainfall for month, 5·71 in. Number of days on which rain fell, 10. During the last week of the month most trying weather was experienced, due to high winds from N.W. by W. A blow during the night of the 25th snapped off a number of bananas and papaws, besides more or less putting over some eighty coffee-trees, all of which had to be staked.

*Coffee.*—Trees all looking well. The green tips of primary branches of all young bearing trees were disbudded so that the tree would not be overtaxed; all the trees were topped, as, owing to the forcing season, the growth has been too quick.

*Vanilla.*—Having again had nice showers during the month, vines have continued to make good progress, and pods are swelling well.

C. E. WOOD,
Manager, Kamerunga State Nursery, Cairns, N.Q.

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF JANUARY, 1915.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Nellie II. ... | Shorthorn... ... | 20 July 1914 | 933 | 3·8 | 41·57 | |
| Miss Jean ... | Ayrshire ... ... | 24 Nov. ,, | 849 | 4·0 | 39·85 | |
| Honeycombe | Shorthorn ... | 27 July ,, | 808 | 3·8 | 35 99 | |
| Lady Melba | Holstein ... ... | 6 Mar. ,, | 751 | 4·0 | 35·21 | |
| Miss Melba... | ,, ... ... | 22 Nov. ,, | 1,082 | 2·8 | 35·19 | |
| Butter ... | Shorthorn ... | 20 Nov. ,, | 880 | 3·4 | 34·97 | |
| Simple Interest | Jersey ... ... | 24 Nov. ,, | 643 | 4·6 | 34 84 | |
| Miss Lark ... | Ayrshire ... ... | 31 Oct. ,, | 735 | 4·0 | 34·46 | |
| Madam Melba | Holstein ... ... | 8 Sept. ,, | 1,020 | 2·9 | 34·40 | |
| Special Edition | Jersey ... ... | 19 Dec. ,, | 625 | 4·5 | 33·12 | |
| Burton's Lily | Shorthorn ... | 17 Nov. ,, | 776 | 3·6 | 32·24 | |
| Lady Margaret | Ayrshire ... ... | 19 June ,, | 721 | 3·8 | 32·09 | |
| Daisy ... | Holstein ... ... | 26 Nov. ,, | 966 | 2·8 | 31·72 | |
| Lucinda ... | Ayrshire ... ... | 20 Sept. ,, | 628 | 4·2 | 31·00 | |
| Silver Nell... | Shorthorn... ... | 5 Oct. ,, | 693 | 3·8 | 30·85 | |
| Bluebelle ... | Jersey ... ... | 27 May ,, | 611 | 4·2 | 30·16 | Natural pasture only. |
| Miss Edition | ,, ... ... | 10 July ,, | 470 | 5·4 | 29·98 | |
| Burton's Lady | Shorthorn... ... | 23 July ,, | 669 | 3·8 | 29·79 | |
| Sweet Meadows | Jersey ... ... | 28 July ,, | 446 | 5·6 | 29·52 | |
| Rosebud ... | Ayrshire ... ... | 20 Sept. ,, | 770 | 3·2 | 28·72 | |
| Lowla II. .. | Shorthorn-Ayrshire | 23 Sept. ,, | 636 | 3·8 | 28·32 | |
| Lady Lil ... | Jersey ... ... | 22 Aug. ,, | 496 | 4·7 | 27·47 | |
| Glen ... | Shorthorn... ... | 26 Oct. ,, | 775 | 3·0 | 26·98 | |
| Miss Bell ... | Jersey ... ... | 13 Aug. ,, | 474 | 4·8 | 26·82 | |
| Pauline ... | Shorthorn ... | 12 Oct. ,, | 757 | 3·0 | 26·41 | |
| Lark ... | Ayrshire ... ... | 27 July ,, | 663 | 3·4 | 26 33 | |
| Davidina ... | ,, ... ... | 17 July ,, | 557 | 3·8 | 24·78 | |
| Rosine ... | ,, ... ... | 23 Sept. ,, | 502 | 4·2 | 24·75 | |
| Dollie ... | Shorthorn ... | 19 Dec. ,, | 602 | 3·4 | 23·91 | |
| Laurette II. | Ayrshire ... ... | 10 Nov. ,, | 682 | 3·0 | 23·82 | |
| Countess of Brunswick | Shorthorn... ... | 27 July ,, | 647 | 3·0 | 22·59 | |
| Lady Spec ... | Ayrshire ... ... | 24 Oct. ,, | 574 | 3·2 | 21·40 | |

## RELATIVE TO ADDITION OF FISH OILS TO SKIM MILK, ETC.

In response to a letter to the Department addressed to Messrs. Barnes and Co., Ltd., Mr. G. Green, of Goomburra, relative to the addition of fish oils to skim milk as a cheap and valuable food for stock, in January last, Mr. E. Graham, Dairy Expert, wrote:—

Animals have a natural repugnance to highly rancid and offensive smelling oils, and for this reason some grades of fish oil are not suitable for the purpose in question.

However, the addition of either animal or vegetable oil to skim milk would increase its feeding value. Average cow's milk contains from 3½ to 4 per cent. of butter fat, consequently that is the percentage of oil that is to be added to the skim milk in order to replace the amount of fat extracted from the milk by the process of "separation."

In the actual feeding of added oil and skim milk to swine, there is usually a difficulty in getting the oil to emulsify with the skim milk, but this trouble is possibly easiest of adjustment by pouring the oil on a little dry pollard and allowing the pollard to absorb it; then mix the oil-laden pollard with the skim milk in the required proportion. Cocoanut-oil cake is specially valuable for the purpose of feeding to lower animals in conjunction with skim milk, as the oilcake contains a considerable amount of nitrogenous matter in a form that is easily to be assimilated.

Concerning molasses and its sugar-content: Sugar-mill molasses contains from 45 to 60 per cent. of sugar, and the molasses may be fed to swine in conjunction with other food, but as the molasses has a laxative influence, it is not to be fed in excessive quantities.

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## CREAM AND BUTTER FAT.

In reply to a letter from a correspondent, relative to the difficulty experienced in making the cream yield up its butter fat, Mr. E. Graham, Dairy Expert, says:—

There are several causes influencing the churning of cream, and in the absence of a full knowledge of the particulars governing the specific case under review, it is possibly best to treat briefly with the causes that are most probably responsible for the trouble.

Occasionally it happens that a churn of unsuitable pattern is employed for the service of churning cream. In a general way hand-power churns are to be classified under three headings—viz., the plunger, dash, and paddle principle, the firstnamed being the least satisfactory.

Again, the cream may not contain sufficient acidity at the time its churning is attempted, and in this case the remedy most likely to be effective is to allow the cream to ripen for another day before churning operations are commenced.

Further, there is a possibility that the butter-fat content of the cream may be unduly low and the process of churning retarded as a consequence. An adjustment of the cream screw of the separator would remove this difficulty, and result in the production of a "thicker" cream. Should the cream, after attention has been given to the above matter, still maintain its reluctance to churn, then place the churn containing the cream in a bath of warm water for several minutes, and renew churning operations.

If the above measures prove ineffective in inducing the cream to churn, it is obvious that the cause arresting the churning of cream is attributable to the stage of growth of the pastures to which the cows have access, and only a change in the nature of the fodder consumed by the dairy stock will restore the cream to a normal condition.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JANUARY, 1915.

Five thousand two hundred and nine eggs were laid during the month. Owing to some of the birds having broken into moult, there has been a slight falling off; but, taken altogether, the output of eggs has been very good for this time of the year. One of Mr. Fanning's White Leghorns died of heat apoplexy, and has been replaced. Mr. E. V. Bennett's White Leghorns win the monthly prize with 158 eggs. The following are the individual records:—

| Competitors. | Breed. | Jan. | Total. |
|---|---|---|---|
| A. T. Coomber | White Leghorns | 131 | 1,328 |
| Moritz Bros., S.A. | Do. | 154 | 1,306 |
| Loloma Poultry Farm, N.S.W. | Do. | 149 | 1,298 |
| T. Fanning | Do. | 115 | 1,287 |
| Geo. Tomlinson | Do. | 136 | 1,238 |
| Cowan Bros., N.S.W. | Do. | 137 | 1,221 |
| Loloma Poultry Farm, N.S.W. | Rhode Island Reds | 124 | 1,205 |
| R. Burns | Black Orpingtons (No. 1) | 130 | 1,205 |
| A. F. Camkin, N.S.W. | White Leghorns | 141 | 1,202 |
| Kelvin Poultry Farm | Do. | 104 | 1,197 |
| A. H. Padman, S.A. | Do. | 149 | 1,192 |
| Mrs. Munro | Do. | 141 | 1,188 |
| E. Le Breton | Do. | 137 | 1,186 |
| Marville Poultry Farm, Victoria | Do. | 153 | 1,185 |
| T. Fanning | Black Orpingtons | 143 | 1,168 |
| R. Burns | Do. (No. 2) | 136 | 1,158 |
| E. V. Bennett, S.A. | White Leghorns | 158 | 1,158 |
| Derrylin Poultry Farm | Do. | 138 | 1,158 |
| Mrs. Bieber | Brown Leghorns | 132 | 1,157 |
| R. Burns | S. L. Wyandottes | 122 | 1,144 |
| F. McCauley | White Leghorns | 142 | 1,140 |
| J. T. Coates | Do. | 139 | 1,137 |
| J. R. Wilson | Do. | 115 | 1,132 |
| J. Franklin | Do. | 122 | 1,132 |
| J. T. Coates | Black Orpingtons | 110 | 1,121 |
| J. M. Manson | Do. (No. 1) | 136 | 1,117 |
| G. E. Austin | Do. | 121 | 1,111 |
| J. Kilroe | Do. (No. 2) | 137 | 1,105 |
| R. Jobling, N.S.W. | Do. | 109 | 1,097 |
| J. Zahl | Do. | 145 | 1,090 |
| J. Gosley | Do. | 121 | 1,087 |
| Range Poultry Farm | Do. | 128 | 1,080 |
| D. Moreton, N.S.W. | Do. | 131 | 1,073 |
| J. D. Nicholson, N.S.W. | Do. | 118 | 1,063 |
| Mrs. Bradburne, N.S.W. | Do. | 105 | 1,035 |
| J. N. Waugh, N.S.W. | Do. | 135 | 1,027 |
| C. M. Jones | Do. | 105 | 1,026 |
| J. Kilroe | Do. (No. 1) | 106 | 1,018 |
| J. Murchie | Brown Leghorns | 124 | 1,017 |
| J. M. Manson | White Leghorns (No. 2) | 130 | 1,001 |
| Totals | | 5,209 | 45,790 |

# The Orchard.

## A FINE PEACH.

We have been shown by the Director of the Intelligence and Tourist Bureau a very fine peach grown by Mr. H. M. Jones, of Rural Retreat, weighing 10¼ oz. It is a very handsome freestone fruit, and Mr. Jones's

PLATE 5.—PEACH GROWN AT STANTHORPE BY MR. H. M. JONES, RURAL RETREAT; WEIGHT, 10¼ OUNCES.

peaches were awarded first prize in their class at the recent Stanthorpe Show. A model cast of this peach has been made for permanent exhibition at the Bureau. Some time ago we were asked in London 5s. each for peaches of this class.

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## SUGAR BANANAS AT SUNNYBANK.

Mr. M. McLaughlin, who grew the bananas here depicted, says:—"This hand of fourteen bananas, weighing 3 lb., cut from a bunch of seven dozen and a-half, have had no watering and only 2 in. of rain during the past six months. I attribute the size to the formula advised

in the "Agricultural Journal," viz., one part sulphate potash and two of superphosphate of lime and blood and bone with a little stable manure in two dressings annually of 3 lb. each. The plants are 12 ft. apart, and grown in groves do better than in single lines because of the shade one row casts on the roots of the other."

PLATE 6.—SUGAR BANANAS GROWN AT COOLIBAR, SUNNYBANK, BY MR. J. MCLAUGHLIN.

## REJUVENATION OF BANANA PLANTATIONS.

"No other cultivated plant exhausts the soil to such an extent as bananas," writes Mr. J. C. Brünnich, Agricultural Chemist, in a paper read before the International Congress of Tropical Agriculture. Isolated cases of abandoned old banana fields being replanted and yielding good crops, even without the aid of manures, have been reported in Queensland.

On this subject a very interesting article is published in "The Philippine Agriculture Review," vol. vii., 1914, entitled "The Rejuvenation of Depleted Abacá Fields," by F. P. Nickles, Agricultural Inspector.

The Abacá is the species of banana known as *Musa textilis,* from which Manila hemp is obtained. What holds good in the renovation of an Abacá plantation, will, it is reasonable to suppose, hold good with any variety of the Musa family. The article referred to is well worth the attention of banana growers in Queensland, and reads as follows:—

"The methods generally used at the present time for the production of abacá are practically the same as they were many years ago when the fibre began to be an important article of commerce in the Philippine Islands. During these years great advances have been made in agricultural pursuits, and the question may well be asked as to whether the methods used to-day for the production of abacá are the best that may be had with our present knowledge of the science of agriculture.

"In January, 1912, the Bureau of Agriculture started a series of experiments at the La Carlota Experiment Station, in Occidental Negros, to determine some of the many points in which it seemed probable that improvements might be made. These experiments are far from completed at the present time, but already they have proved instructive. Individuals, also—notably in the Moro Province—have attempted certain changes in their usual methods and with considerable success. Based upon results of tests and investigations made by the Bureau of Agriculture, and upon methods adopted to advantage by various individual planters, certain methods have recently been devised for the production of abacá which are decidedly superior to the general practice now in use. For the purpose of bringing them before the abacá producers, demonstration work was recently started in the Bicol Provinces, and it is hoped that eventually these methods may be generally adopted throughout the abacá-producing provinces. It is the purpose of this paper to fully describe them so that they may be sufficiently understood to put them to practical use.

"First, the conditions as they exist in the industry to-day should be described so that the application of any system of improvements may be better understood. If the old abacá fields are compared with those more recently planted or with those which are more favourably situated with respect to soil fertility, one quickly realises that a very large percentage of the abacá land is producing much less fibre than it could. In many districts there are, of course, large areas of virgin soil, suitable

for abacá, which might be planted and which would produce a superior crop for several years. Most of this land is inaccessible, however, and with the common methods in use it would eventually degenerate to a state similar to that existing at present. Improvements should be applicable to the older abacá fields as well as those to be planted for the first time.

"In considering the present methods for growing abacá, the lack of any process which can be called genuine cultivation, using the word in its narrower sense, should be noted. The nearest to it that may be found in the abacá fields is a spasmodic cutting of grass and weeds with the bolo. The life of the abacá plant is twelve to twenty years. When the plants die they are replaced by transplanting a few single plants to the spots left vacant, and the planting is done unsystematically and too closely. There is practised neither cultivation, rotation of crops, nor fertilisation in any form. That they produce as well as they do is a proof of the fertility of Philippine soils.

"Naturally, then, cultivation is the first and most logical way to bring about the desired increase in the yield of plantations. At present there does not seem to be any crop which may be grown extensively in rotation with abacá. As for fertilisation, the usual practice of applying commercial fertilisers or animal excrement is, in the majority of cases, too expensive to be justifiable. From cultivation an elimination of foreign vegetation, a more rapid conversion of plant food in the soil into a form available to abacá and a great improvement in the physical condition of the soil may be expected. These results would tend directly to increase the growth of the plants. Cultivation, however, necessitates the expenditure of money. Since the returns per hectare are relatively low in this industry, the problem is to keep this expenditure down to a point where it is justified by the increase in profits. This has been accomplished by using cowpeas (sitao) as a cover crop and green manure. The principle features of these methods are, *absolutely clean preliminary cultivation,* and the *planting of cowpeas as a cover crop and green manure.*

"The best time to start the preliminary cultivation is the last part of the dry season when the hot sun and the generally dry conditions greatly assist in the killing of weeds and the burning of trash. By the time the preparation is finished, the rainy season will be at hand and the field may be planted.

"The clearing of the field is the first operation. All trees, brush, and old abacá should be dug up and removed or burned. Exception may be made to a few varieties of trees which are beneficial to abacá for their shade. It is better, however, to remove all trees. Shade-trees may be planted later in a systematic manner. When the larger vegetation is removed, the field should be ploughed, the number of times depending on conditions, but not less than three times will always be necessary. A period of one week may advantageously be left between ploughings in order that weeds and grass lying exposed may be killed by the sun. The ploughings should be at least 20 centimetres in depth.

If light ploughs are used, this depth may easily be reached by passing the plough twice in the same furrow. The field should finally be harrowed once or twice to smooth it.

PLATE 7.—NEW, VIGOROUS, AND LUXURIANT ABACA GROWN BY THE NEW METHOD ON THE SITE OF OLD AND DEPLETED PLANTS LA CARLOTA EXPERIMENT STATION.

"The best plough to use in large and comparatively level fields free from rocks is a heavy steel plough requiring the use of four animals. This ploughs a deep, wide furrow and is not easily broken on roots or stumps. Since many of the labourers in the abacá districts are not familiar with heavy ploughs or the handling of so many animals

together, the light steel ploughs requiring only one animal may be used. These would also be better in rocky and small fields. Ploughs of this type with a single handle are sold by two or three companies in Manila at very reasonable prices. The ordinary native plough, which merely scratches the top of the ground, is of no value in this work. Several types of harrows might be used but probably the best for the purposes of the abacá grower is the type called the ' Shear harrow.' This has the advantage of being comparatively light, and, since one is not apt to encounter heavy sod in abacá fields, it will do efficient work. Cultivators will also be necessary, to take the place of the harrow after the abacá has been planted. The only other tools needed are shovels to be used in planting the abacá, the round-pointed kind being the best.

" The planting should be done about the beginning of the rainy season or shortly before. In this connection, it is best to plant the cowpeas first. In case seed is not available at the time, they may, however, be planted after the abacá is up. The cowpeas should be sown broadcast, rather thickly, and harrowed in by the cultivator or smoothing harrow, care being taken that they are sown evenly. If the ploughing has been recent, the last smoothing may serve to cover them. In case it is necessary to sow the cowpeas after the planting of the abacá, it will be necessary to wait until the abacá is up, when they may be sown broadcast as in the first case and covered with the cultivator, passing the latter between the rows of abacá.

" The abacá should be planted immediately after the cowpeas or at least before they are up, in check rows at a distance of 3 metres. The first operation is to mark off the field. For this a tape and a supply of small, rough stakes will be necessary, the latter to mark the position of the hills of abacá. Where fields of some size are to be planted, a long wire tape would be useful. This may be made of light wire and every third metre marked by a ring, link, or in some other manner. With the tape, lay off a base line along the longest side of the field and mark it off into 3-metre lengths by the stakes. At one end of this line and at right angles with it, lay off another line along the end of the field, marking this line also into 3-metre lengths. Next, by placing one end of the tape at the second stake in the base line and passing it (the tape) through a point 3 metres from the farthest stake in the other line, a second row of stakes may be added. This row of stakes will represent the second row of abacá. If this process is continued across the whole field, it will be laid off into 3-metre squares, the corners of the squares (marked by stakes) being the positions of the hills of abacá. Holes, 20 to 30 centimetres in diameter and 30 centimetres in depth, should then be dug at the location of each stake for the reception of the plants.

" For planting, abacá rootstocks should be used—that is, the underground part of the stalk. These may best be secured by digging up the entire plant and then cutting off the stalk, the cut to be made about an inch above the crown of the root. The best rootstocks come from plants which are not too old, and rootstocks which are 12 to 15

centimetres in diameter at the top are better than larger or smaller ones. Each should have at least three healthy buds. In practice, when two or more fields are to be planted in one season, the clearing of the second field can be postponed until the first is planted. Rootstocks may then be secured from the second field to plant the first. In some cases, also, if the preparation is done quickly and is immediately followed by the planting, the rootstocks from the same field may be used for replanting. They will keep for some time. In planting the rootstocks, one should be placed right side up in each hole and covered, not too deeply, but at such a depth that the top will be about 5 centimetres from the surface of the ground.

"It might be well to explain the reasons for using rootstocks instead of large or nearly mature plants as is the usual custom. Plants developed from the buds of a rootstock are usually much stronger and faster growing than those from a large plant. When the latter is transplanted, the roots are damaged and most of the energy of the plant goes to keep it alive. Rarely more than one or two suckers develop and they, being ill-nourished, make a slow growth. By the usual methods the use of large plants might be justified, since the little plants growing from a rootstock in the midst of grass and weeds would probably die unless mothered by an older plant until they were able to take care of themselves. There are no weeds, however, with these methods, and at the end of a year there would be several good-sized plants each with its own root system, while with the other method there would be one worthless stalk and a few small suckers.

"At this point may properly come the question of shade-trees. There is no experimental evidence on this question. Their value in any case would depend largely on the season and on the usual distribution of humidity throughout the year. In the Bicol Provinces the consensus of opinion among the abacá growers is that they are of considerable value but not absolutely necessary. In those provinces there is a distinct dry season and sometimes droughts of greater or less severity. Probably a judicious use of shade-trees would be advantageous, not only for shade but for the protection they would give from high winds. If used, they may be planted at any time after the planting of the abacá, in check rows at a distance of 21, 25, or 27 metres, depending on the size that the tree will reach at maturity. These distances have been chosen so that the trees may be planted with the rows of abacá, giving as little trouble as possible in cultivating the field. The variety or varieties chosen should be from the three or four generally accepted as the best for this purpose. There are two varieties of dap-dap (*Erythrina indica*, Lam.), leguminous trees, which are good; and there are one or two other good varieties. A shade-tree to be of value should be deep rooted, quick growing, and have a wide low head which does not give too heavy a shade. It is almost necessary that they be leguminous. There is a growing custom in the Bicol Provinces of planting pili trees in the abacá fields. The pili tree is not a good shade-tree,

and it robs the abacá of food material, and would, therefore, be detrimental to the latter. It is possible, however, that the income from the nuts would more than offset the loss in abacá. This question will have to be left to the experience and judgment of the grower.

" From the planting of the abacá, the field should need no attention (shade-trees excepted) until the cowpeas have matured—a period of three to three and a-half months. At this time it will be necessary to harvest the crop of cowpea seed so that it may be available for replanting. The pods may be picked by hand and afterwards threshed. The vines should at once be turned under with the plough to serve as a green manure. Some care should be taken in turning them under. If they are very rank, it would be well for a man to follow the plough to lay them along the furrow. Otherwise, they will gather in bunches in front of the plough, and those which are not covered will catch on the cultivator when the cowpea seed is covered.

" A second crop of cowpeas should be planted very soon after the vines ploughed under. This may be done in the same manner as before, by sowing them broadcast and covering them with the cultivator. If the supply of seed is insufficient for this, it may be sown in drills, three rows of cowpeas between each two rows of abacá. The drills may be marked out by the plough and the sowing and covering done in one operation, the covering being done by the feet. The first method is preferable, for in the latter weeds may spring up before the cowpeas completely cover the ground.

" The process of replanting the cowpeas should be continued for a period of fourteen to eighteen months. When a crop of cowpeas matures it should be harvested, the vines ploughed under, and the crop promptly replanted. At the end of the eighteen months, or earlier in some cases, the abacá will be so large and the hills so wide that animals passing between the rows will break the abacá; furthermore, the grounds will be so shaded that the cowpeas will not grow.

" It is well to note what would be accomplished by the use of the cowpeas. First, the field is thoroughly prepared and cleared of all weeds. Then follows the planting of the cowpeas and the abacá. Within a week the cowpeas will be well up, and within three weeks they will completely cover the ground.

" Since the field was thoroughly cleared of weeds in the first place, they will not start for some time, and those that do spring up later will be choked by the thick matlike growth of the cover crop. If each crop of cowpeas is replanted as soon as mature, it will result in a field free from weeds for the whole period of eighteen months. The cost of this will have been the cost of harvesting, ploughing, and replanting the cowpeas three or four times a year—a very reasonable expense. From four to six crops will have been incorporated in the soil, each returning not only what it took out but the nitrogen which it absorbed from the air. The effect on the physical condition must also be considered. The vines, ploughed under, add so much decaying vegetable matter or humus to the soil—a substance making it light and friable and most favourable

PLATE 8.—SIX-MONTHS-OLD ABACA PLANT GROWN ON AN OLD PLANTATION WITH THE NEW METHOD. COWPEA COVER CROP IN FOREGROUND. LA CARLOTA EXPERIMENT STATION.

for the growth of most of our domestic plants. Soil in this condition will absorb water readily, and a larger part of the heavy precipitations during the rainy season will soak into the ground instead of running off. In the case of a bad drought, this one factor might be of great value. No other crop can take the place of the cowpeas. Camotes, which are

frequently planted when new ground is cleared, while they help somewhat in keeping down the weeds, do not make the rank growth of the cowpeas, and, not being leguminous, they reduce the fertility of the soil rather than add to it. Peanuts and some other leguminous crops could be used but generally their growth is not heavy enough to give full protection from weeds. Mongo is probably the only substitute that could be used successfully, but this crop has not been proven entirely satisfactory in many localities. It is seen, then, that the cowpeas serve several purposes: They take the place of a large amount of cultivation that would otherwise be necessary; they act as a fertiliser, adding more plant food to the soil than they take out; and they improve the physical condition of the soil, indirectly also, and lessen the danger of a drought by increasing the absorption of moisture.

"At the end of eighteen months the cowpeas may no longer be planted. The abacá will have attained considerable height, and the hills will have spread until practically all of the ground is shaded. The field should average not less than fifteen stalks to the hill. The stalks will not have attained their greatest size until a year or two later; but, what is of greatest importance, they will be in an actively growing condition. Well nourished from the beginning, they will develop much faster than abacá grown under ordinary conditions, and weeds, if they eventually creep in, will have less advantage over them. They will have a resilience, a latent force, to recover quickly after a severe drought, typhoon, or any other destructive force over which the planter has no control.

"Cultivation may be discontinued from this period until after the fourth or fifth year or until the field has been harvested three or four times. The harvesting of the mature stalks allows the sun to penetrate to the soil and steps are again necessary to prevent the growth of weeds. This may best be accomplished by using the plough and cultivator. If, as the field grows older, the plough and cultivator are impracticable, regular and systematic use of the hoe may be resorted to. The bolo method which is practised at present has never been effective.

"The above methods are based upon agricultural principles which have been well tested and which are successfully used to-day in actual practice. The only doubt that the abacá grower can have is one of financial success. Every crop has a limit where increased care and cultivation will not bring increased profits, but in the production of abacá care and cultivation are practically nil. A certain amount of cultivation, judiciously applied, should well repay itself. The average yield of fibre per hectare in the islands is less than 380 kilos (6 piculs), and it is doubtful if the best of the ordinary "lates" in the Bicol Provinces exceed 575 kilos (9 piculs) per hectare. By the above methods, under ordinary conditions, a planter should be able to harvest about 650 kilos (10 piculs) per hectare the third year, and 1,000 kilos (16 piculs), or more, thereafter. Just how long a field cultivated by the above methods would hold its superiority would depend upon how

clean it was kept, how heavily the abacá was cut, and other factors, but it should turn out more than the ordinary crop for a period of about fifteen years.

"A planter considering the adoption of these methods should not think that he has to grow all his abacá under this system. Nearly every planter has a few "lates" which have been recently cleared and planted or which are favourably situated with regard to fertility, the yield of which is above the ordinary. He may also have some that are situated on steep hillsides or that are very rocky, which would make cultivation like the above exceedingly difficult. Such fields may be left while attention is given to the older and more impoverished. Almost without exception these are the ones which may be most easily cultivated. The best plan would be to clear and plant a number of hectares each year—say, from 5 to 10, according to the ability of the planter. Even 2 or 3 hectares a year, in ten years, would convert his worst "lates" into the best on the hacienda. It should be realised that after the second year returns will begin to come in, and by the fourth year a field should have paid for the original expense and any other expenses dependent upon the use of these methods.

"The following is a fair estimate of the cost of clearing, planting, and cultivating 1 hectare of abacá up to the end of the eighteen months. Sixty-five centavos, without meals, has been taken as the daily wages for labourers.

| | Pesos | Pesos. |
|---|---|---|
| Clearing .. .. .. .. .. | 30 | |
| Ploughing and harrowing .. .. .. | 10 | |
| Preparing rootstocks and planting cowpeas and abacá .. .. .. .. .. | 25 | |
| Total preliminary expenses .. .. | | 65 |
| Ploughing under and replanting cowpeas four to six times during the first eighteen months | | 20 |
| Total expense, clearing, planting, and cultivation during the first eighteen months .. .. .. .. | | 85 |

"The aforementioned cultural methods have special reference to the renovation of old abacá fields. With slight modifications in the preliminary preparation, they may also be used advantageously in the planting of new land. It should be understood that the methods have not been described completely in every detail. These may be worked out by the planter himself to suit the peculiar conditions of his plantation. The main points, however, should be carried out, and the planter should not forget that absolutely clean preliminary cultivation is the foundation upon which these methods are based, and the proper use of the cowpeas is necessary for their successful operation.

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1 hectare = 2·471 acres; 1 kilo = 2·2 lb.; 1 metre = 1·09 yards; 1 centimeter = 0·39 in. (about $\frac{2}{5}$ in.)

# Horticulture.

## AGRICULTURAL EXPERIMENT GARDENS IN CONNECTION WITH PUBLIC SCHOOLS.

By P. R. GORDON.

Reference was made, a few weeks ago, in the Brisbane Press, to a new and very prolific potato raised by the senior pupils of the public school at Drumwhindle, in the parish of Ellon, Aberdenshire. This school is situated a few miles distant from where I was born and spent the earliest years of my life, and I have taken a lively interest in it. The head master, Mr. Lewis Gavin, is an enthusiast on the subject, and his work has been recognised by the Education Department and his services requisitioned in the organisation of similar schools in other centres. His success in engendering in the youthful minds a taste for the cultivation of the soil, leading them to become, in after life, primary producers, instead of attracting them to cities and towns to join forces with the many engaged in secondary industries whose sole existence is dependent on the produce of the soil, has been very marked. But it is not in agriculture alone that the pupils receive instruction. Æsthetic taste is encouraged, particularly among the younger pupils in the cultivation of flowers, and many of them carry the work on at their homes, with the result that around many of the cottages in the district are neat flower gardens where formerly the vegetation consisted of "kale runts" or useless weeds. The objects of the school garden are many. Not only has the observation of the pupils to be trained and sharpened, but experiments have to be made to find out definite results for the successful cultivation of plants by observing their habits, their likes and dislikes so as to obtain their fullest fruition. Those experiments entail a great amount of care, accuracy, and watchfulness in the youthful gardeners, which early inculcates in them habits of method and desire for truth. Many experiments are conducted at the garden—some failures, many most interesting and useful to the farming community, as in root selection, in potato-growing, and in the use of artificial manures. In potato cultivation five definite results were arrived at:—The wider the tubers were planted the greater the yield. In fact, it was surprising to find no less than 4 tons per acre in yield between those planted in drills 3 ft. apart and 1½ ft. between sets. 2. Tubers "greened" and sprouted have a marked difference of being at least a fortnight earlier in maturity than those planted from the pit, and come above ground regularly with very few blanks, and greater in yield. 3. Tubers, whole, and about the size of a duck's egg show positively for the fourth year in succession a difference of 6 tons 9 cwt. 72 lb. per acre, in comparison with those cut and weighing practically the same before planting as the cut tubers. 4 (and very important). The drills ought to run north and south, as the drills are exposed on one side only if running east and west, and are not

acted on equally by the sun's rays, which play a very important part in the cultivation of good sound tubers. The difference in yield amounts to about 2½ tons per acre. Each row shades its neighbour and prevents the growth of tissue and tuber as in rows running north and south. 5. From this it may be deduced that too deep planting has to be avoided, and by experiments, 4, 5, 6, and 7 in. deep, the yield from a depth of 4 in. is the most satisfactory. The following varieties were grown last year, and the results show the relative value in yields:—

| | Per Acre. | | |
|---|---|---|---|
| | Tons. | Cwt. | Lb. |
| 1. British Queen .. .. .. | 7 | 13 | 106½ |
| 2. Ashleaf .. .. .. .. | 5 | 8 | 4 |
| 3. Duchess of Cornwall .. .. .. | 8 | 10 | 18 |
| 4. Balgownie Seedling .. .. .. | 12 | 11 | 20½ |
| 5. Faithlie .. .. .. .. | 8 | 10 | 17 |
| 6. Snowdrop .. .. .. .. | 15 | 16 | 0 |
| 7. Harbinger .. .. .. .. | 3 | 15 | 73 |
| 8. Devanha Seedling .. .. .. | 5 | 18 | 94 |
| 9. Fortyfold .. .. .. .. | 6 | 15 | 5 |
| 10. Reading Russet .. .. .. | 14 | 13 | 5 |
| 11. Drumwhindle (seedling) .. .. | 17 | 11 | 13 |
| 12. Cottar .. .. .. .. | 14 | 11 | 78 |
| 13. Crofter .. .. .. .. | 14 | 11 | 0 |
| 14. Shetland Champion .. .. .. | 14 | 0 | 100 |
| 15. Grampian .. .. .. .. | 8 | 4 | 84 |
| 16. Up-to-date .. .. .. .. | 15 | 10 | 12 |

It will be seen from the above that the school seedling (Drumwhindle) is the most prolific of the whole. It was sold by the pupils to a well-known firm of seedsmen for £40 per ton. They were tried at the Royal Horticultural Society's Station, in Surrey, and proved a remarkably good "cropper" and "cooker," a most marketable variety, having no deep eyes, and what there are are on the apex.

The experiments with artificial manures (which were gifted to the school) gave very interesting trials in the various plots, containing potatoes, cabbages, eschalots, parsley, and turnips, to determine the effects of the various manures on each of these. The results are given in the following table:—

| Manure. | Potato. Lb. | Cab'ge. Lb. | Eschalot. T'tl. Lb. |
|---|---|---|---|
| Sulphate of Potash .. .. | 61½ | 84 | 3¾—149¼ |
| Superphosphate .. .. | 66 | 76 | 3⅛—145⅛ |
| Nitrate of soda .. .. | 61¾ | 90 | 2¼—154 |
| Sulphate of ammonia, + sulphate of potash .. | 66¼ | 92 | 5⅛—163⅜ |
| Sulphate of potash, + superphosphate .. .. | 56½ | 72¼ | 3¾—132½ |
| Sulphate of ammonia, + superphosphate .. .. | 66 | 82 | 3⅞—151⅞ |

The effect was seen in the various colours of the leaves, those treated with nitrates especially being of a very dark green, but having a tendency in the tuber crop to grow too much to stem. Of grasses, small patches were sown with home svalof (Sweden), grown samples

of clover, timothy rye, and cocksfoot, and in each case the svalof seed was much stronger and the produce much freer from obnoxious weeds.

One can easily imagine the beneficial effects of these experiments on the pupils in developing correct observation and their reasoning faculties. But the greatest value of these studies is that they have attracted the youthful mind to settlement on the soil. The pupils are not only allowed to conduct their experiments—of course, under surveillance—but they are entrusted with the sale of their products, so that a healthy rivalry is set up between the different groups of youthful experimenters; the money from sales being devoted to garden work.

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JANUARY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JANUARY, 1915 AND 1914, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | | Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|---|---|---|---|---|
| | Jan. | No. of Years' Records. | Jan., 1915. | Jan., 1914. | | Jan. | No. of Years' Records. | Jan., 1915. | Jan., 1914. |
| *North Coast.* | In. | | In. | In. | *South Coast*—continued: | In. | | In. | In. |
| Atherton ... ... | 14·97 | 13 | 2·56 | 7·23 | Nanango ... ... | 4·78 | 27 | 2·15 | 3·25 |
| Cairns ... ... | 18·83 | 27 | 3·29 | 21·69 | Rockhampton ... | 9·54 | 27 | 4·26 | 0·74 |
| Cardwell ... ... | 17·54 | 27 | 10·02 | 21·68 | Woodford ... ... | 7·40 | 27 | 2·78 | 4·06 |
| Cooktown ... ... | 15·24 | 27 | 8·19 | 33·93 | Yandina ... ... | 10·45 | 21 | 6·23 | 6·95 |
| Herberton ... ... | 10·49 | 27 | 0·90 | 6·41 | | | | | |
| Ingham ... ... | 16·95 | 22 | 13·95 | 17·36 | | | | | |
| Innisfail ... ... | 25·28 | 27 | 7·97 | 15·52 | *Darling Downs.* | | | | |
| Mossman ... ... | 22 71 | 5 | 6·32 | 32·30 | | | | | |
| Townsville ... ... | 13 70 | 36 | 9·33 | 14·90 | Dalby ... ... | 3·75 | 27 | 2·40 | 3·28 |
| | | | | | Emu Vale ... .... | 3·32 | 17 | 3·83 | 1·95 |
| *Central Coast.* | | | | | Jimbour ... ... | 4·13 | 24 | 1·90 | 2·27 |
| | | | | | Miles .. ... | 4·17 | 27 | 0·38 | 2·60 |
| Ayr ... ... ... | 12·11 | 27 | 2·12 | 10·11 | Stanthorpe ... | 4·16 | 27 | 3·36 | 2·06 |
| Bowen ... ... | 11·05 | 27 | 0·34 | 6·83 | Toowoomba ... | 5·69 | 27 | 2·33 | 3·73 |
| Charters Towers ... | 6·45 | 27 | 1·58 | 2·95 | Warwick ... ... | 3·89 | 27 | 1·74 | 1·52 |
| Mackay ... ... | 15·73 | 27 | 2·94 | 22·52 | | | | | |
| Proserpine ... ... | 18·23 | 11 | 1·02 | 11·19 | | | | | |
| St. Lawrence ... | 11·23 | 27 | 1·73 | 7·97 | *Maranoa.* | | | | |
| | | | | | Roma .. ... | 3·77 | 25 | 0·43 | 1·13 |
| *South Coast.* | | | | | | | | | |
| | | | | | *State Farms, &c.* | | | | |
| Biggenden ... ... | 5·18 | 14 | 3·23 | 1·33 | | | | | |
| Bundaberg ... ... | 10·62 | 27 | 3·86 | 1·39 | Gatton College ... | 4·48 | 14 | 2·42 | 5·40 |
| Brisbane ... ... | 6·52 | 64 | 2·11 | 3·90 | Gindie .. ... | 3·82 | 13 | 0·06 | 2·66 |
| Childers ... ... | 9·01 | 19 | 2·43 | 2·20 | Kamerunga Nurs'y | 17·98 | 23 | 2·73 | 28·97 |
| Crohamhurst ... | 13·44 | 22 | 5·78 | 6·71 | Kairi ... ... | ... | ... | 3·96 | 11·05 |
| Esk ... ... ... | 5·71 | 27 | 5·43 | 2·58 | Sugar Experiment Station, Mackay | 14·70 | 16 | ... | 24·88 |
| Gayndah ... .... | 5·76 | 27 | 5·59 | 4·13 | | | | | |
| Gympie ... ... | 7·55 | 27 | 4·97 | 5·05 | Bungeworgorai ... | ... | ... | 0·27 | 0·92 |
| Glasshouse M'tains | 10·09 | 6 | 8·66 | 6·27 | Warren ... ... | ... | ... | 2·08 | 0·75 |
| Kilkivan ... ... | 6·49 | 27 | 3·10 | 1·52 | Hermitage ... | 2·71 | 7 | 1·92 | 1·41 |
| Maryborough ... | 8·33 | 27 | 3·39 | 2·07 | | | | | |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals or January this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

Bracewell, Mount Larcom, rainfall for January, 1915, 3·00 in.

The tropical disturbance which occurred off the Queensland coast between 9th and 11th February last resulted in the following very heavy rainfalls, especially in the Southern Coast Division:—

## CENTRAL DIVISION.

| | Pts. | | Pts | | Pts. |
|---|---|---|---|---|---|
| Coastal— | | | | | |
| Emu Park .. | 5 | Mount Chalmers .. | 11 | | |

## SOUTHERN DIVISION.

| | | | | | |
|---|---|---|---|---|---|
| Coastal— | | Hillview .. .. | 154 | Tiaro .. .. | 305 |
| Brisbane .. .. | 552 | Howard .. .. | 407 | Toogoolawah .. | 412 |
| Bundaberg .. | 603 | Ipswich .. .. | 312 | Wallaville .. .. | 92 |
| Beaudesert .. | 269 | Isis Junction .. | 371 | Wondai .. .. | 222 |
| Beenleigh .. .. | 510 | Kilcoy .. .. | 580 | Woodford .. .. | 1,146 |
| Biggenden .. | 158 | Kilkivan .. .. | 212 | Woody Island .. | 280 |
| Boonah .. .. | 175 | Kingaroy .. .. | 215 | Woolooga .. .. | 360 |
| Booval .. .. | 340 | Laidley .. .. | 239 | Wooroolin .. .. | 230 |
| Burnett Head .. | 272 | Landsborough .. | 1,095 | Yandina .. .. | 765 |
| Bustard Head .. | 2 | Laravale .. .. | 247 | Yimbun .. .. | 505 |
| Cape Moreton .. | 662 | Lowood .. .. | 386 | | |
| Caboolture .. | 902 | Many Peaks .. | 43 | Darling Downs— | |
| Caboonbah .. | 441 | Mapleton .. .. | 1,275 | Allora .. .. | 21 |
| Caloundra .. .. | 681 | Marburg .. .. | 340 | Bell .. .. | 78 |
| Camboon .. .. | 2 | Maryborough .. | 370 | Cambooya .. | 65 |
| Cleveland .. .. | 772 | Moore .. .. | 465 | Clifton .. .. | 19 |
| Colton .. .. | 460 | Mount Crosby .. | 430 | Dalveen .. .. | 3 |
| Childers .. .. | 230 | Mount Morgan .. | 2 | Dalby .. .. | 61 |
| Cooroy .. .. | 783 | Mount Perry .. | 150 | Emu Vale .. .. | 25 |
| Cowan Cowan .. | 870 | Mungar Junction .. | 406 | Gowrie Junction .. | 100 |
| Crow's Nest .. | 287 | Murgon .. .. | 200 | Greenmount .. | 52 |
| Degilbo .. .. | 123 | Nambour .. .. | 866 | Jondowaie .. .. | 1 |
| Double Island Point | 202 | Nanango .. .. | 205 | Jimbour .. .. | 9 |
| Dunwich .. .. | 864 | Nerang .. .. | 495 | Jondaryan .. .. | 49 |
| Eidsvold .. .. | 19 | Oxenford .. .. | 580 | Killarney .. .. | 15 |
| Engelsburg .. | 240 | Palmwoods .. | 1,170 | Kuvura .. .. | 16 |
| Ernest Junction .. | 440 | Petrie .. .. | 1,041 | Malakoff .. .. | 55 |
| Esk .. .. | 465 | Pialba .. .. | 408 | Meringandan .. | 155 |
| Eumundi .. .. | 765 | Rockhampton .. | 1 | Oakey .. .. | 72 |
| Forest Hill .. | 196 | Rathdownie .. | 140 | Pittsworth .. | 36 |
| Gatton .. .. | 258 | Redbank .. .. | 284 | Spring Bluff .. | 190 |
| Gin Gin .. .. | 65 | Redcliffe .. .. | 940 | Toowoomba .. | 153 |
| Gladstone .. .. | 12 | Rosedale .. .. | 62 | Warwick .. .. | 5 |
| Goodwood .. .. | 465 | Rosewood .. .. | 290 | Yangan .. .. | 26 |
| Gayndah .. .. | 65 | South Passage .. | 829 | | |
| Grandchester .. | 270 | Southport .. .. | 300 | Maranoa— | |
| Gundiah .. .. | 335 | St. Helena .. .. | 997 | Roma .. .. | 14 |
| Gympie .. .. | 532 | Tallebudgera .. | 430 | St. George .. .. | 5 |
| Harrisville .. .. | 209 | Tewantin .. .. | 562 | Wallumbilla .. | 8 |
| Helidon .. .. | 200 | Theebine .. .. | 635 | | |

## METROPOLITAN.

| | | | | | |
|---|---|---|---|---|---|
| Annerley .. .. | 521 | Goodna .. .. | 375 | Pinkenba .. .. | 715 |
| Ascot .. .. | 694 | "Huntingtower" .. | 560 | Rocklea .. .. | 535 |
| Bald Hills .. .. | 954 | Indooroopilly .. | 503 | Sandgate .. .. | 960 |
| Boggo Junction .. | 530 | Manly .. .. | 870 | Sunnybank .. | 514 |
| Botanic Gardens .. | 593 | Mayne Junction .. | 700 | Taringa .. .. | 253 |
| "Chiefswood" .. | 570 | Milton .. .. | 565 | Toowong .. .. | 510 |
| Coorparoo .. .. | 572 | Murarrie .. .. | 720 | Wynnum .. .. | 735 |
| Enoggera Rly. Sty. | 652 | Newmarket .. | 550 | Yeerongpilly .. | 519 |
| Enoggera Reservoir | 647 | Nudgee College .. | 1,029 | Zillmere .. .. | 815 |
| Gold Creek Reservoir .. .. | 697 | Nundah .. .. | 795 | | |
| | | Oxley .. .. | 454 | | |

# Tropical Industries.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following monthly report from the Acting Entomologist to the Bureau (Mr. E. Jarvis) :—

## FIELD WORK.

At the beginning of this month beetles emerged in sufficient numbers to make it worth while commencing observations relative to their movements at night time, principally with a view to testing the influence of artificial light of various colours on the adult female of albohirta.

Arrangements had previously been made to conduct these experiments at the Carrah Estate, Gordonvale, the manager of which, Mr. J. H. Greenaway, kindly offered to render any assistance in his power.

I was at first disposed to think that ordinary white light might prove disappointing, some entomologists being of opinion that it exercises little or no impression on this particular cane beetle, although it is undoubtedly attractive to related species of the genera Anoplognathus, Xylotrupes, &c. It was decided, nevertheless, to commence experimentation with the flame of an acetylene hand-lamp fitted with a burner of 28 litres capacity, placed in a beetle-trap specially designed by the writer for this branch of control. On the 5th instant, the trap was accordingly installed among young plant-cane, and the light directed towards scrub land about 100 yards distant, but beetles were evidently very scarce as only three were caught on this date and seven during two succeeding evenings. On the 9th and 11th instant, however, a few heavy showers fell, establishing soil conditions conducive to freer emergence of the beetles, and it was then that definite results were obtained, conclusively proving our grey-backed cane-beetle (*Lepidiota albohirta*) to be strongly attracted to white light. The following table recording observations during three successive evenings is not without interest:—

| SKY CLEAR; NO WIND; NO MOON. | | | LEPIDIOTA ALBOHIRTA. | | |
|---|---|---|---|---|---|
| Date. | Average Temperature. | Hours. | Beetles Caught. | Male. | Female. |
| 14 December | 76° F. | 8 p.m. to 11 p.m. | 51 | 40 | 11 |
| 15 „ .. | 76° F. | 8 „ 9 „ | 57 | 46 | 11 |
| 16 „ .. | 77° F. | 8 „ 10 „ | 62 | 45 | 17 |
| | | | 170 | 131 | 39 |

Other influencing meteorological conditions are omitted here for the sake of brevity, but it may be mentioned that on the 16th (when sixty-two specimens were captured) the trap was faced towards the centre of the field away from feeding trees with the object of attracting beetles that might be emerging among the cane. It was remarked that although they started to fly when the lamp was lighted at about 7.20 p.m., the first specimens entered the trap on each of these evenings exactly at 8 o'clock, from which we may infer that albohirta does not readily respond to the influence of artificial light until the last signs of day have faded and been replaced by a certain degree of darkness. The above habit has a practical bearing on this form of control, and will receive further investigation.

Having obtained satisfactory proof of the attractiveness of artificial light, the movements and flight of the beetles whilst under its influence were carefully studied, this being an important consideration, seeing that no form of light-trap can be of much use unless constructed with view to taking full advantage of the mode of approach manifested on such occasions.

It is unnecessary at present to allude in detail to these observations, but I feel sure that comparative failure during past years has been mainly due to lack of this essential knowledge. Certain practical conclusions were arrived at regarding the kind of design best calculated to produce a really serviceable trap, and the precise conditions under which such a trap might reasonably be expected to achieve payable results. It is but fair to state that the total figures tabled above represent only six hours' catch, and would doubtless have been higher had the the experiment on each evening been prolonged throughout the night; moreover, the single trap used scarcely illuminated one cardinal point of the compass, and it was believed that the beetles had not appeared in full numbers. It will be interesting to note during future research whether a few days' exposure to the sun whilst feeding renders adults of this species indifferent to the influence of artificial light. I am inclined to believe that under favourable circumstances reaction towards the latter is likely to be continuous, but in any case they are certainly susceptible during their first flight immediately after leaving the soil, and if captured at that time oviposition is prevented.

Unfortunately the measure of success obtainable by light-traps is determined by prevailing climatic and other conditions, the beetles at times being disinclined to fly for perhaps several consecutive nights, and then suddenly appearing on the wing in vast numbers.

Knowledge of this fact, however, need not deter us from attempting to utilise a method of control which, practised systematically, can hardly fail to be remunerative on badly infested areas. It would be a simple matter to compile a table of directions based on reliable data from which farmers could tell at a glance when to use such traps, and so be saved the time and expense of lighting them to little or no purpose.

These investigations, and others of more importance, relative to the control of this insect during its adult stage, will be continued as long as the beetles are in evidence.

## LABORATORY NOTES.

Recent experimental work with the Samoan fungus (*Metarrkizaim anisophioe*, Metsch) has resulted in a 50 per cent. infestation of grubs of our cane-beetle (*Lepidiota rothai*) after a period of twenty-eight days, the first larva being killed and covered with fungus spores nine days after infection, and others succumbing to its attacks a fortnight later.

Young larvae of albohirta will be procurable in about five weeks, when it is hoped to commence a series of experiments similar to the above, to be continued throughout the larval stage of this species.

Methods of infection proving successful in the laboratory will, if possible, be tested in the field at a time of year when weather conditions are propitious to a speedy development of fungus diseases.

Referring very briefly to the work of breeding and studying life-histories of economic insects of sugar-cane, I may mention that during the past month adults of four additional species of lepidopterous insects not hitherto recorded have been reared from larval forms.

Three of these butterflies, of minor importance, belong to the family Hesperidæ, the caterpillars of which were found destroying foliage of cane plants near Babinda and at Gordonvale; while the fourth is a most interesting moth-borer, not yet identified, that was observed tunnelling the centre of young shoots of ratoon cane on a plantation at Mount Pyramid, occasioning injury identical in character to that caused by our noctuid moth-borer (*Phragmatiphila truncata*, Hamps).

## RECORD SHIPMENT OF BUTTER.

By the s.s. "Carpentaria," which left Brisbane on the 12th February for London, there were despatched 35,953 boxes of butter, all of which had been inspected and passed for export by officers of the Department of Agriculture and Stock. This constitutes the largest shipment of butter which has yet been despatched in one ship, and represents 2,013,368 lb.

## A VALUABLE COW.

What is claimed to be the champion dairy cow of the world was sold recently in the United States for £1,020, which is believed to be the highest price ever paid for a dairy cow. This cow, Mayrilma—a Guernsey—has a yearly record of 19,673 lb. of milk, containing 1,073 lb. of butter fat.

# Plant Pathology.

## PINEAPPLE CULTIVATION.

The following report on "Alleged Diseases in Pines at Woombye" was received during last year by the Under Secretary for Agriculture and Stock from Mr. H. Tryon, Government Entomologist and Vegetable Pathologist. It will serve to allay any fears which some pineapple growers entertain as to the presence of supposed disease in the plant:—

1. In prosecuting the investigation the pineries of the following growers claimed attention:—Messrs. Blagden, Clayton, Collier, H. Davis, S. Davis, F. Fairley, J. Foote, W. Furlong, Garrod, Innes, R. Kerr, Kerslake, A. G. Reynolds, J. Rose, senr., C. Rose, Skene, Southwick and Sons, T. Smith, C. T. Whittaker, and Wilks; the several plantations referred to ranging from 35 acres to ½ acre in extent.

2. As, generally speaking, they were kept in a clean condition, and occupied sloping ground so as to be seen individually from many vantage points, a satisfactory general inspection was practicable without the long expenditure of time, beyond that mentioned; at the same time these features would especially conduce to the discovery of any abnormal state of growth if present.

3. As the outcome of this inquiry, it was found that almost without exception (*vid.* paragraph 9) the rows of plants exhibited a remarkably uniform, even, and vigorous condition, and elsewhere where evenness had not characterised their appearance, this was traceable either to a relatively inferior character of soil or defective cultivation (*vid.* paragraph 11).

4. In explanation of this favourable state of things, it may be mentioned that these soils reposing on gentle slopes conduce to effective aeration and drainage, and although evidently varying in fertility within small limits, were on the whole remarkably alike in texture, being "warm," free sandy loams—such soils indeed as prove congenial to the plant in question wherever my extended observations have shown that it is grown successfully.

5. On traversing the different plantations the conclusion derived from a general survey was sustained on examination of individual rows and their component plants; no instance of disease—of insect or fungus origin—claimed attention, but notwithstanding there were grounds for concluding that Mealy Bug (*Dactylopius Broneliae*) was present sporadically in small amount.

6. As evidence in support of this finding, all the growers interrogated appeared satisfied with their circumstances and prospects, holdings had recently changed hands at improved values, areas under cultivation were being increased, and both yield and prices were being maintained.

7. Previous to the inquiry, it had been brought under notice that the behaviour of pineapple plants derived from a Woombye farm and grown in another district had led it to be inferred that they were infected with some disease that occurred on this farm at the time when they were received, and such an explanation might seem quite plausible when no other one of the occurrence was conceived; but the outcome of an examination in the course of this inquiry of the pineapple cultivations on the farm in question, and even of the bed of these plants, whence, as it was stated, the suckers referred to had been derived, was to show that it was untenable. For, as a matter of fact, not only was no disease discoverable, or evidence of the presence of one existing in the past forthcoming, but the grower himself was actually, at the time of our visit, using—as was pointed out—plants from the very source that was under suspicion, for increasing the area of his own cultivation; and these, moreover, I found to be quite healthy.

8. With respect to a second farm, it was pointed out by local pineapple growers that an instance of failure was afforded by pineapple plants growing in a small area amongst such as were apparently quite healthy, and that immediately surrounded them; and that this occurrence had already been brought under the department's notice by its proprietor. This failure I found, as alleged, to be quite local, in a cultivation of several acres in extent, where the pines were characterised by vigour and healthiness. Evidently, too, that it was a case of root-poisoning, and therefore not a disease proper. Also that the plants implicated had grown normally, and in many cases produced fruit immediately before their decadence had commenced. In explanation of this very exceptional occurrence, as regards the Woombye district and its pineries, it was noted that immediately above the small area occurred a stratum of impervious clay (such as is occasionally seen interstratified with the Ipswich sandstone, the geological formation of the district) that traversed almost horizontally the small hill, in one slope of which the plants grew, near its summit, and indeed virtually formed a basin-like receptacle for the "drainage." On the heavy rainfall being experienced that had preceded the incident under consideration, the accumulated stagnant water had obviously overflown and percolated through the soil beneath, and, spreading out in a fan-like manner as it progressed, had come in contact with the roots of the plants in this area affected, had injured these, and so with their destruction the plants themselves had gradually ceased to grow or even died—with top rot as a symptom.

9. Such an occurrence might have been repeated whenever analogous conditions of the land occurred, but a second one did not come under notice. However, a clay band was seen outcropping in land destined for an additional pinery, and the proprietor shown how to drain off the poisonous ferruginous water which issued where this was so, as had been already the pineapple grower above alluded to.

10. Another cultivation—a very small one, with respect to which a distant prospect suggested disease occurrence—was also visited. Here it was found that the land had never been properly tilled, or even broken up by a plough or spade; and that in places, accordingly, such friable soil as had occurred superficially had almost entirely been removed by surface drainage. As a result, the plants included in this area were small and depauperated, but though at a standstill as regards growth, were otherwise perfectly healthy.

11. Having witnessed elsewhere the effects of disease in seriously injuring pineapple cultivation, and in bringing this local horticultural industry to a standstill, where indeed not rendering it wholly impracticable, I ventured to counsel those growers I met, and pointed out to them the imperative obligation they were under to maintain their plantations in the healthy condition in which I had found them, and to avoid, therefore, as far as possible all risks of introducing disease that was inseparable from the admission of further pineapple plants from without; but, rather, having already in their possession a good and profitable plant, to render it still better by the adoption of the most approved methods of horticultural practice as applied to the pineapple. And that the condition of the Citrus cultivation of the district, the outcome of a diametrically opposite policy being pursued, was a striking object lesson pointing to the expediency of compliance in this respect with my teaching.

## WOOL GROWN ON THE COAST.

Mr. Alec Hay (Coolangatta) writes:—"Your report of the wool sales on the 12th instant records the fact that 7,287 bales were sold, including private transactions. The highest prices reported were as follows:—New Zealand Loan, 6 bales at 13d.; Australian Mortgage, Land, and Finance Company, 8 bales at 13¼d.; Australian Mortgage, Land, and Finance Company, 9 bales at 13¼d.; Winchcombe, Carson, and Co., 7 bales at 13½d.; Winchcombe, Carson and Co., 7 bales at 13d. The Coolangatta Estate forwarded to this sale 83 bales, 43 of which were sold at 12¾d.; so that out of this large catalogue of 7,287 bales, only 37 bales beat the coastal grown wool. Messrs. Schute, Bell's report of 5th November, 1907, states:—'A. Hay, Coolangatta, 16 bales 14d., 11 bales 13½d., good, useful quality, dry condition, fair length'; this being the top price obtained at the sale. The wool sold on the 12th instant was grown on the same indifferent coastal country as that sold in November, 1907, with a frontage to the ocean from the Crookhaven River to the north head of Jervis Bay, and it has been continuously used for sheep for the past ten years, and most of the wool recently sold is from locally-bred sheep. There are many millions of acres along our seaboard of far superior quality to the land used in the present instance, and more adaptable to sheep and wool growing, yet one hears repeatedly the old fallacy that coastal lands are unsuitable for sheep. It might be interesting to the public if some of our experts would take the trouble of reporting on this question and the suitability of the coastal country, and so enlighten those who would, if certain of the results, take up and improve some of this cheap land for the production of crossbred wool."—"Sydney Morning Herald," 17th February.

[The above fully bears out the contention of the Queensland sheep and wool expert, Mr. J. G. Brown, that our coastal lands are perfectly suitable for sheep raising, right down to the sea shore, provided the right breed be selected, and proper attention be given to the flocks.—Ed., "Q. A. J."]

# Answers to Correspondents.

## PROPAGATION OF TAMARIND SEEDS.

"Tamarind Seeds," Mullet Creek—

1st. Seeds may be planted from September to February inclusive. If planted during the cooler months some protection should be afforded for the young seedlings.

2nd. It is advisable to sow the seeds in a well-prepared bed or in boxes, and transplant during moist weather when the seedlings are a few inches high. If only a few trees are required the seed may be sown in permanent positions where they will grow quicker if protected from injury.

3rd. A good sandy loam is preferable, but they will grow in a wide range of soils.

4th. The period before bearing varies in different localities (about five years).

5th. Little or no pruning is required except thinning out crossing or crowded branches and keeping a symmetrical shape.

## PRUNING OF MULBERRY TREES.

A. H. Havell, Wondai—

The fruit is produced on the young wood of the previous summer's growth. About one-third of each shoot should be pruned off during winter. The remaining wood will produce finer fruit. Prune out crossing or crowded wood and keep your tree in good shape. Judicious pruning improves all trees.

## REMEDY FOR WORMS IN MARES.

Worm powders, containing sulphate of iron 6 oz. and tartar emetic 2 oz.; the ingredients to be thoroughly mixed together and made into twelve powders, one to be given daily in food. This will hurt neither mare nor foal.

## DEATH OF PIGS.

From the symptoms described, it appears that the animals are suffering from pneumonia. Cement floors are not so good for pigs as wooden ones. Pigs should always be kept dry and sheltered from wind and rain, as they are very susceptible to cold and pneumonia. Prevention in this case seems to be what is required. One drachm nitrate of potash and 1 drachm chlorate of potash should be given twice daily to each pig to relieve the cough.

## HORNY FORMATION ON COW'S BRAND.

Wash the wound thoroughly three times daily with warm water, and afterwards dress with boracic acid.

## HOVEN.

From the symptoms described the animal is suffering from Hoven. Probably the food he is getting does not agree with him, and it would be advisable to change his diet. In the meantime, ½ lb. Epsom salts with ½ lb. treacle should be given, followed twice daily by 1 oz. bi-carbonate of soda dissolved in half a pint of tepid water.

## HARVESTING COWPEAS.

Cut for hay when the crop is beginning to pod. Put the vines in cocks shortly after harvesting, otherwise the leaves will drop off.

## TAMARINDS.

1. The best time to sow tamarinds is from September to February inclusive. If planted during the cooler months some protection should be afforded to the young seedlings.

2. It is advisable to sow the seeds in a well-prepared bed or in boxes, and transplant during moist weather when the seedlings are a few inches high. If only a few trees are required, the seed may be sown in permanent positions, when they will grow quicker if protected from injury.

3. A good sandy loam is preferable, but tamarinds will thrive in a wide range of soils.

4. The bearing period varies in different localities (about five years).

5. Little or no pruning is required except thinning-out crossing or crowded branches, and keeping a symmetrical shape.

## COTTON.

R.J.H., Diddillibah—

The sample of cotton submitted is a tree cotton (perennial), apparently a Caravonica or Sea Island.

The demand for the latter is limited, and it is not advisable to grow it largely in Queensland, notwithstanding that, previous to the war, good Sea Island was worth from 15d. to 20d. per lb. ginned.

At present cotton is very low priced in the home market, Upland being worth barely 5d. per lb., and all the Sea Island cotton needed can be grown in the United States; 1½d. per lb. is paid by the Agricultural Department for seed cotton, and any profit made, after ginning, freight, and other expenses have been deducted, is handed to the seller.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR FEBRUARY, 1915.

| Article. | | FEBRUARY. Prices. |
|---|---|---|
| Bacon | lb. | 11½d. |
| Bran | ton | £9 5s. |
| Butter | cwt. | 124s. to 130s. |
| Chaff, Mixed | ton | £5 5s. |
| Chaff, Oaten | „ | £7 to £7 10s. |
| Chaff, Lucerne | „ | £4 to £5 10s. |
| Chaff, Wheaten | „ | £4 |
| Cheese | lb. | 7½d. to 7¾d. |
| Flour | ton | £13 |
| Hams | lb. | 1s. 2d. to 1s. 3½d. |
| Hay, Oaten (Victorian) | ton | £9 10s. |
| Hay, Lucerne | „ | £5 |
| Honey | lb. | 2d. to 3d. |
| Maize | bush. | 4s. to 4s. 2d. |
| Oats | „ | 3s. 6d. |
| Onions | ton | £12 to £13 |
| Peanuts | lb. | 3d. |
| Pollard | ton | £9 10s. to £10 |
| Potatoes | „ | £5 to £6 |
| Potatoes (Seed) | „ | £8 to £13 10s. |
| Potatoes (Sweet) | cwt. | 3s. 9d. to 4s. |
| Pumpkins | ton | £3 10s. |
| Wheat, Milling | bush. | 6s. 2d. |
| Eggs | doz. | 10d. to 1s. 3d. |
| Fowls | pair | 3s. 9d. to 5s. |
| Geese | „ | 4s. 9d. to 5s. 9d. |
| Ducks, English | „ | 2s. 6d. to 3s. 3d. |
| Ducks, Muscovy | „ | 4s. to 5s. 6d. |
| Turkeys (Hens) | „ | 8s. 6d. |
| Turkeys (Gobblers) | „ | 16s. |

### VEGETABLES.

| | | |
|---|---|---|
| Cabbages | per dozen | 1s. 6d. to 4s. 6d. |
| Beans | per sugar bag | 1s. 6d. to 4s. |
| Peas | „ | 4s. to 7s. |
| Cucumbers | per dozen | 3d. to 6d. |
| Custard Marrows | „ | 4d. to 9d. |
| Vegetable Marrows | „ | 1s. to 2s. |
| Tomatoes | per quarter-case | 1s. to 4s. |

## SOUTHERN FRUIT MARKETS.

| Article. | FEBRUARY. Prices. |
|---|---|
| Bananas (Queensland), per case | 5s. to 10s. |
| Bananas (G.M.), per case | 21s. to 22s. |
| Bananas (Fiji), per case | 18s. to 20s. |
| Mangoes, per case | 4s. to 10s. |
| Oranges, per case | 5s. to 9s. |
| Passion Fruit, per half-case | 2s. to 4s |
| Papaw Apples, per half-case | 6s. to 10s. |
| Pineapples (Queens), per case | 6s. to 8s. |
| Pineapples (Ripleys), per case | 4s. to 6s. |
| Pineapples (Common) per case | 4s. to 6s |
| Tomatoes, per quarter-case | 3s. to 5s. |
| Rockmelons, per double case | 3s. to 5s. |
| Watermelons, per dozen | 4s. to 12s. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | FEBRUARY. Prices. |
|---|---|
| Apples (American), Eating, per case | 12s. to 13s. |
| Apples (Local), per case | 2s. 6d to 5s. 6d. |
| Apples Cooking, per case | 3s. to 5s. |
| Apricots, per quarter-case | ... |
| Bananas (Cavendish), per dozen | 2d. to 3d. |
| Bananas (Sugar), per dozen | 1½d. to 2d. |
| Cape Gooseberries, per quarter-case | ... |
| Cherries, per quarter-case | ... |
| Cocoanuts, per sack | 12s. to 15s |
| Cumquats, per case | ... |
| Custard Apples, per quarter-case | ... |
| Lemons (Local), per case | 3s. to 7s. |
| Lemons (Lisbon), per case | 6s. to 7s. |
| Limes, per case | ... |
| Mandarins, per half-case | 8s. |
| Mangoes, per case | 1s. to 4s. |
| Nectarines, per quarter-case | 1s. to 3s. |
| Oranges (Japanese Navel), per case | 20s. |
| Oranges (other), per case | 20s. |
| Papaw Apples, per quarter-case | 9d. to 1s. 6d. |
| Passion Fruit, per quarter-case | 1s. 9d. to 3s. 6d. |
| Peaches, per quarter-case | 1s. to 3s. |
| Peanuts, per pound | 3d. |
| Pears (Victorian William), per case | 6s. to 8s. |
| Persimmons, per quarter-case | 1s. 9d. to 3s. |
| Pineapples (Ripley), per dozen | 1s. 3d. to 3s. |
| Pineapples (Rough), per dozen | 4d. to 1s. 6d. |
| Pineapples (Smooth), per dozen | 1s. 6d. to 3s. 6d. |
| Plums, per quarter-case | 2s. 6d. to 4s. |
| Rockmelons, per dozen | 3s. |
| Rosellas, per sugar bag | ... |
| Strawberries, per tray | ... |
| Strawberries, per dozen boxes | ... |
| Tomatoes, per quarter-case | 6d. to 1s. |
| Watermelons, per dozen | 1s. to 1s. 6d. |

## TOP PRICES, ENOGGERA YARDS, JANUARY, 1915.

| Animal. | JANUARY. Prices. |
|---|---|
| Bullocks | £16 to £17 17s. 6d. |
| Bullocks (single) | £25 5s. |
| Cows | £10 5s. to £14 10s. |
| Cows (single) | £17 2s. 6d. |
| Merino Wethers | 22s. 3d. |
| Crossbred Wethers | 22s. 9d. |
| Merino Ewes | 20s. 3d. |
| Crossbred Ewes | 24s. 6d. |
| Lambs | 20s. |
| Pigs (Bacon) | ... |
| Pigs (Porkers) | 30s. |

## TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

| Date. | JANUARY. | | FEBRUARY. | | MARCH. | | APRIL. | |
|---|---|---|---|---|---|---|---|---|
| | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 4·57 | 6·45 | 5·22 | 6·42 | 5·41 | 6·20 | 5·58 | 5·46 |
| 2 | 4·57 | 6·45 | 5 22 | 6·42 | 5·42 | 6·19 | 5·58 | 5·45 |
| 3 | 4·58 | 6·46 | 5 23 | 6·41 | 5·43 | 6·18 | 5·59 | 5·44 |
| 4 | 4·58 | 6·46 | 5·23 | 6·41 | 5·44 | 6·17 | 5·59 | 5·43 |
| 5 | 4·59 | 6·47 | 5·24 | 6·40 | 5·45 | 6·15 | 6·0 | 5·42 |
| 6 | 4·59 | 6·47 | 5·24 | 6·40 | 5·45 | 6 14 | 6·0 | 5·41 |
| 7 | 5·0 | 6 47 | 5·25 | 6·39 | 5·45 | 6·13 | 6·1 | 5·40 |
| 8 | 5·1 | 6·47 | 5·26 | 6·38 | 5·46 | 6·12 | 6·1 | 5·39 |
| 9 | 5·2 | 6·47 | 5 27 | 6·37 | 5·46 | 6·11 | 6·2 | 5 38 |
| 10 | 5·3 | 6 47 | 5·28 | 6 36 | 5·47 | 6·10 | 6 2 | 5 37 |
| 11 | 5·3 | 6·47 | 5·29 | 6 36 | 5 47 | 6·9 | 6·3 | 5·36 |
| 12 | 5·4 | 6·47 | 5 30 | 6 35 | 5·48 | 6·8 | 6 4 | 5·34 |
| 13 | 5·5 | 6·47 | 5 30 | 6 34 | 5·48 | 6·7 | 6·4 | 5·34 |
| 14 | 5·6 | 6 47 | 5·31 | 6·34 | 5·49 | 6·6 | 6·4 | 5·33 |
| 15 | 5·7 | 6 47 | 5·32 | 6·33 | 5·49 | 6·5 | 6·5 | 5·32 |
| 16 | 5 8 | 6·47 | 5·33 | 6·32 | 5·50 | 6·4 | 6·5 | 5·31 |
| 17 | 5 9 | 6 47 | 5·34 | 6 31 | 5·50 | 6·3 | 6·6 | 5·30 |
| 18 | 5·10 | 6 47 | 5 34 | 6·30 | 5·51 | 6·2 | 6·6 | 5·29 |
| 19 | 5·11 | 6·46 | 5·35 | 6·29 | 5·52 | 6 0 | 6·7 | 5 28 |
| 20 | 5·12 | 6·46 | 5·36 | 6·28 | 5·53 | 5·59 | 6 8 | 5 27 |
| 21 | 5·12 | 6·46 | 5·36 | 6·28 | 5·53 | 5·58 | 6 8 | 5·26 |
| 22 | 5·13 | 6·45 | 5·37 | 6·27 | 5·53 | 5·57 | 6·9 | 5·25 |
| 23 | 5·14 | 6 45 | 5 37 | 6·26 | 5·54 | 5·56 | 6·9 | 5·24 |
| 24 | 5·15 | 6·45 | 5·37 | 6 25 | 5·54 | 5·55 | 6·10 | 5 23 |
| 25 | 5·16 | 6·44 | 5·38 | 6·24 | 5 54 | 5·54 | 6·10 | 5 22 |
| 26 | 5·16 | 6·44 | 5·38 | 6·23 | 5·55 | 5·53 | 6·11 | 5·21 |
| 27 | 5·17 | 6·44 | 5·39 | 6 22 | 5·55 | 5 52 | 6·11 | 5·20 |
| 28 | 5·18 | 6·44 | 5·40 | 6·21 | 5·56 | 5·51 | 6·12 | 5·20 |
| 29 | 5·19 | 6·43 | ... | ... | 5·56 | 5·50 | 6·12 | 5·19 |
| 30 | 5 20 | 6·43 | ... | ... | 5·57 | 5·49 | 6·13 | 5·18 |
| 31 | 5·21 | 6·43 | ... | ... | 5·58 | 5·48 | ... | ... |

### PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 1 Jan. | ○ | Full Moon | 10 | 20 | p.m. |
| 9 „ | ☽ | Last Quarter | 7 | 12 | a.m. |
| 16 „ | ● | New Moon | 12 | 41 | „ |
| 23 „ | ☾ | First Quarter | 3 | 32 | p.m. |
| 31 „ | ○ | Full Moon | 2 | 41 | „ |

The moon will be brightest, under favourable atmospheric conditions, when in the last quarter, as it will then be nearer to the earth.

| | | | | | |
|---|---|---|---|---|---|
| 7 Feb. | ☽ | Last Quarter | 3 | 11 | p.m. |
| 14 „ | ● | New Moon | 2 | 31 | „ |
| 22 „ | ☾ | First Quarter | 12 | 58 | „ |

There will be no actual Full Phase this month, two having occurred in January. The moon will be nearest to earth on 7th February at 11·18 p.m.

| | | | | | |
|---|---|---|---|---|---|
| 2 Mar. | ○ | Full Moon | 4 | 32 | a.m. |
| 8 „ | ☽ | Last Quarter | 10 | 27 | p.m. |
| 16 „ | ● | New Moon | 5 | 42 | a.m. |
| 24 „ | ☾ | First Quarter | 8 | 48 | „ |
| 31 „ | ○ | Full Moon | 3 | 38 | p.m. |

The moon will be nearest the earth on the 5th at 1 p.m., and farthest from the earth on the 21st at 11·12 a.m. The moon's distance from the earth at these times will be about 225,000 miles, and about 252,000 miles, respectively.

| | | | | | |
|---|---|---|---|---|---|
| 7 Apr. | ☽ | Last Quarter | 6 | 12 | a.m. |
| 14 „ | ● | New Moon | 9 | 36 | p.m. |
| 23 „ | ☾ | First Quarter | 1 | 39 | a.m. |
| 30 „ | ○ | Full Moon | 12 | 19 | „ |

The moon will be in perigee, or nearest to the earth, on the 2nd at 9·36 a.m., and on the 30th at 5·12 p.m. It will be in apogee, or farthest from the earth, on the 18th at 1 36 a.m.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

# Orchard Notes for April.

## THE SOUTHERN COAST DISTRICTS.

The gathering and marketing of citrus fruit, as well as of pines, bananas, custard apples, persimmons, &c., is the principal work of the month. In the Notes for March attention was drawn to the necessity for keeping all pests in check, particularly those attacking the ripening fruit. As it is the height of folly to look after the orchard thoroughly during the growing period of the crop and then to neglect the crop when grown, every possible care must be taken to keep fruit fly, peach moth, black brand, or other pests that destroy or disfigure the fruit in check, and this can only be accomplished by combined and systematic action. Citrus fruit at this time of the year often carries badly, as the stem is tender, easily bruised, full of moisture, and, consequently, very liable to the attacks of the blue mould fungus, which causes specking. The loss from this cause can be lessened to a considerable extent by carefully attending to the following particulars:—

1st. Never allow mouldy fruit to hang on the trees or to lie about on the ground. It should be gathered and destroyed, so that the countless spores which are produced by the fungus shall not be distributed broadcast throughout the orchard, infesting many fruit, and only waiting for a favourable opportunity, such as an injury to the skin by an insect or otherwise, combined with favourable weather conditions (heat and moisture), to start into growth.

2nd. Handle the fruit carefully to prevent bruising. Cut the fruit, don't pull it, as pulling is apt to plug the fruit—that is to say, to either pull the stem out or injure the skin round the stem—and a fruit so injured will go mouldy.

3rd. Sweat or dry the fruit thoroughly; if the weather is humid, laying the fruit out in the sun on boards or slabs is a very good plan.

4th. After sweating, examine the fruit carefully, and cull out all bruised or punctured fruit, and only pack perfectly sound dry fruit. It is better for the loss to take place in the orchard than for the loss to take place in the case in transit.

5th. If the mould is very bad, try dipping the fruit for a few seconds in a 2 per cent. solution of formalin. This will kill the spores, and if the fruit is placed in the sun and dried quickly before packing there will not be much chance of its becoming reinfested.

Don't gather the fruit too green, especially such varieties as the Beauty of Glen Retreat Mandarins, as immature fruit spoils the sale of the good article.

If the orchard has not been cleaned up after the summer rains, do so now; and do any other odd jobs that may be required, such as mending fences, grubbing out dead or worthless trees, cleaning out drains, &c.

Strawberry planting may be continued, and where new orchards are to be planted continue to work the soil so as to get it into the best possible tilth.

### THE TROPICAL COAST DISTRICTS.

Clean up the orchards after the rainy season. Look out for scale insects, and cyanide or spray for same when necessary.

Go over the trees carefully, and when there is dead wood or water sprouts remove them. If bark fungus is showing, paint the affected branches with sulphur and lime wash. Clean up bananas, pineapples, and other fruits, as after the end of the month it is probable that there will not be any great rainfall, so that it is advisable to keep the ground well cultivated and free from weeds, so as to retain in the soil the moisture required for the trees' use during the winter months. Keep bananas netted; destroy guavas wherever found.

### THE SOUTHERN AND CENTRAL TABLELANDS.

If the orchards and vineyards have not already been cleaned up, do so. Cultivate or plough the orchard, so as to get the surface soil into good tilth, so that it can absorb and retain any rain that falls, as, even though the trees will simply be hardening off their summer's growth of wood, it is not advisable to let the ground dry out. When citrus fruits are grown, attend to them in the manner recommended for the Southern Coast Districts; and, when grown in the dry parts, keep the land in a state of good cultivation. Should the trees require it, a light watering may be given. Do not irrigate vines; let them ripen off their wood.

## Farm and Garden Notes for April.

FIELD.—The wheat land should now be ready for sowing the early wheats, and that which has not been prepared should be ploughed without delay, April, May, and June at latest being the months for sowing. The main potato crop, planted in February and March, will now be ready for a first or second hilling up. The last of the maize crop will now have been got in. Where cotton is grown, the pods will now be opening, and advantage should be taken of dry weather to get on with the picking as quickly as possible. Picking should not be begun until the night dew has evaporated nor during rain. Sorghum seed will be ripe. Tobacco also will be ripening, and either the leaves or the whole plant harvested. Lucerne may be sown, as the growth of weeds has now slacked off, but the ground must be thoroughly prepared and cleaned. Sow oats, barley, rye, wheat, mangolds, and Swede turnips. Plant out paspalum roots. Seed wheat of whatever variety soever should be dipped in a solution of sulphate of copper (bluestone) in the proportion of 1 lb. of sulphate to 24 gallons of water. The seed may also be treated with hot water by plunging it in a bag into hot water at 120 degrees Fahr. for a minute or two, and then into water heated to 135 degrees Fahr. Allow it to remain in this for ten minutes, moving it about all the time. Then plunge the seed into cold water and spread out to dry. This plan is

useful in districts where bluestone may not be obtainable. Another safeguard against bunt, smut, black and red rust is to treat the seed with formalin at the rate of 1 lb. of formalin to 40 gallons of water. Schering's formalin costs about 2s. 10d. per lb., and is sold in bottles. It is colourless and poisonous, and should be kept where no children or persons ignorant of its nature can have a chance of obtaining it. To treat the seed, spread it on a wooden floor and sprinkle the solution over it, turning the grain over and over until the whole is thoroughly wetted. Then spread it out to dry, when it will be ready for sowing. Instead of sprinkling, dipping may be resorted to. A bushel or so of seed is placed in a bag and dipped in the solution. During five minutes the bag is plunged in and out, and then the seed is turned out to dry. Formalin is less injurious to the grain than bluestone, but, while the latter can be used over and over again, formalin becomes exhausted. It therefore follows that only the amount required for immediate use for sprinkling should be prepared. Do not sow wheat too thickly. Half a bushel to the acre is sufficient—more on poor land and less on rich soils. On light sandy soil the wheat should be rolled. On sticky land it should only be rolled when the land is dry, otherwise it will cake, and must be harrowed again after rolling. When the wheat is 6 in. high go over it with light harrows. If the autumn and winter should prove mild and the wheat should lodge, it should be kept in check by feeding it off with sheep.

Kitchen Garden.—Hoe continually among the crops to keep them clean, and have beds well dug and manured, as recommended last month, for transplanting the various vegetables now coming on. Thin out all crops which are overcrowded. Divide and plant out pot-herbs, giving a little water if required till established. Sow broad beans, peas, onions, radish, mustard and cress, and all vegetable seeds generally except cucumbers, marrows, and pumpkins. Early celery should be earthed up in dry weather, taking care that no soil gets between the leaves. Transplant cauliflowers and cabbages, and keep on hand a supply of tobacco waste, preferably in the form of powder. A ring of this round the plants will effectually keep off slugs.

Flower Garden.—The operations this month will depend greatly on the weather. If wet, both planting and transplanting may be done at the same time. Camellias, gardenias, &c., may be removed with safety. Plant out all soft-wooded plants such as verbenas, petunias, penstemons, &c. Sow annuals, as carnations, pansy, mignonette, daisy, snapdragon, dianthus, stocks, candytuft, phlox, sweet peas, &c. Those already up must be pricked out into other beds or into their permanent positions. Growth just now will not be too luxuriant, and shrubs and creepers may be shortened back. Always dig the flower beds rough at first, then apply manure, dig it in, and after this get the soil into fine tilth. Land on which you wish to raise really fine flowers should have a dressing of bonedust lightly turned in. Wood ashes also form an excellent dressing for the garden soil. Prune out roses. These may be planted out now with perfect success. Take up dahlia roots, and plant bulbs as recommended for March. Layers that have made sufficient roots should now be gradually severed from the plant, and left for a fortnight before potting, to ripen the young roots.

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# Agriculture.

## FARMING AT COOPER'S PLAINS.

Although many of our experienced farmers, men who have made a success of farming and dairying on rich scrub land or the fat black soils of the plains, are good examples for new chums to follow, the former are often prejudiced against farming in localities where the soil is not so rich as in their own districts, and when applied to for advice are in the habit of affirming that the "new chum" can "save himself the trouble of clearing that land, as it won't grow anything; the land is sour, too poor," etc., etc. Such was the statement made to two enterprising selectors, Messrs. Brown and Tait, who are farming 43 acres on Acacia Ridge, Cooper's Plains. In their own words:—"Proverbial new chums that we are, and both hailing from that little country called Scotland, we paid little attention to the advice given us by our neighbours, who, by the way, have been resident in the district, in some cases, for thirty or forty years, but laboured and persevered with our clearing, and we have now the satisfaction of knowing that our selection will grow, and that very successfully, many useful crops, as the following will prove:—We started off with planting 1,000 pineapple suckers in August, 1914, but, as you know, these take some time to mature so we cannot say what the ultimate result will be. We are, however, quite pleased with the progress they have made since they were put in, so much so that we are going to plant another 1,000 suckers next month if we can get the kind we desire.

"In September last we sowed patches of the following:—Pumpkins, marrows, beans, cucumbers, rock melons, and water melons, notwithstanding the dry spell. We had to give them a start off, and they did exceptionally well. We pulled one of the water melons yesterday and had it weighed at the store, and it turned the scale at 27 lb. The others are practically the same size, but not quite ripe.

"The small patch of maize which we sowed at the beginning of November has, in our estimation, done exceedingly well. In height a good many of the stalks measure 10 ft., while others are 10 ft. 2 in. The cobs are also fairly big, and, in some cases, as many as three and four on one stalk."

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## HINTS FOR WHEAT-GROWERS.

### Storage of Grain.

One of the most effective methods of overcoming weevil attack in grain is to fumigate in air-tight tanks with bisulphide of carbon. This liquid should be placed in saucers on top of the grain, and the lid of the tank or other apertures subsequently made air-tight with clay or other easily removable plastic.

The customary dose works out at 1 oz. of bisulphide to 6¼ bushels of grain, or 1 lb. to every 100 bushels of grain. This substance should not be brought into proximity with a lighted pipe or any form of fire. The tank should be opened about twenty-four hours after the bisulphide has been put in, to allow the fumes to disperse, then the lid may be put back.

If weevils have been present in grain, a second fumigation, about three weeks after the first, is necessary. Bags which have once contained salt are very useful to protect grain from the incursions of insects.

### Harvesting Machinery.

Choice of machinery for harvesting will depend a good deal of the growth made by the crop and its condition. It may be readily understood that when the wheat is lodged it will be very difficult to harvest by means of a stripper. Again, in moist, cloudy weather, stripping is an unsatisfactory method of harvesting. Inquiry should be made by you as to the class of machine available for the purpose, as the purchase of one for the limited amount of crop you intend putting in would not be justified.

### Time for Sowing.

The second to third week in May may be stated as a general period for sowing what are termed "mid-season" wheats. Winter wheats of the Manitoba or Fife type should be planted about a month earlier, but this class of wheat is not recommended for your district; such are more suitable for the cooler parts of the State. Quick maturing wheats may be sown up to the first week in June. Pickling of the seed grain is essential in order to check "smut" and "bunt."

### Directions for Pickling Seed Wheat.

Formalin or bluestone may be used for pickling, and it is thought that the bluestone will be the most satisfactory for your purpose. Treatment of the seed is of no value for "rust."

*Formalin Treatment.*—Soak seed for two hours in a solution containing 1 lb of formalin (a 40 per cent. formaldehyde solution) in 50 gallons of water, and spread out to dry before use.

*Bluestone Treatment.*—Use wooden receptacles. Make up a 2 per cent. solution of bluestone (1 lb. to 5 gallons of water). Place seed in a loosely-woven sack; immerse for three minutes; lift out and drain. Pour grain into a similar class of sack and immerse in limewater (2 lb. to 10 gallons) for at least a minute; lift out and drain. Spread grain out in thin layers to dry. It may be bagged up and kept for some weeks before use, provided it is properly dried first.

Levers can be rigged up to handle grain, and other conveniences arranged where a quantity of seed wheat has to be pickled.

Another way to pickle wheat is to make up a solution at the rate of 1 lb. of bluestone to 1 gallon of water (10 per cent. solution). Spread the grain out on a wooden floor, sprinkle the solution over the mass, and keep shovelling the grain briskly over and over until it is thoroughly mixed and each grain is apparently damp; then dry grain thoroughly and bag up, or else dry sufficiently to put directly through drill when sowing. This method is not so satisfactory as the one previously described.

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## A RURAL INDUSTRY.

which might well be undertaken in Queensland is that of chicory growing. The root in is very great demand in Great Britain, and also locally, owing to the cutting off of supplies from France and Belgium, where it was always largely grown prior to the present war. Before this calamity overtook those countries the price of Belgian chicory was £7 5s. per ton f.o.b. Antwerp. To-day, Dutch chicory, f.o.b. Dutch ports, is quoted at £16 per ton for the dried roots. The wholesale price to retailers of manufactured chicory was £27 per ton, while now it is £45, and the price is still rising. How does this affect the Queensland farmer? The chicory plant will thrive here from south to north as a hardy annual, and will give in this State heavier crops than in Europe. The seed is sown in drills about 16 in. apart in August. Before the leaves cover the ground, the plants are thinned out, and the spaces between the rows should be well cultivated and kept clear of weeds. The plant has a thick, white, fleshy, tap-root, and thrives in any soil which will suit carrots, parsnips, arrowroot, etc. The roots are fit to be dug and dried in from five to six months, and the weight of the crop runs to about from 3 to 5 tons per acre. There are several varieties of chicory, the best being called the "White Loof"—white leaf—which forms a head much like that of the cos lettuce. It is also called the "large-rooted Brussels chicory," from its thick stubby root,

and is the most profitable variety to grow for admixture with coffee. The leaves make excellent fodder for cattle and sheep. To prepare the root for sale as a commercial chicory, the root is first cut into small pieces, dried in a kiln, and then roasted in revolving iron cylinders. The loss in weight by this process is from 20 to 30 per cent. During the roasting, 2 lb. of lard to every hundredweight of chicory are added to give it a lustre like that of coffee. The powder looks like ground coffee, and smells like liquorice. The crop is ready to dig in February, our hottest month. There is no more difficulty in growing chicory than in growing any other root crops, such as parsnips, arrowroot, or cassava.

Chicory used to be grown to some extent at Cairns, where it was sliced and dried in the sun, bagged, and sent South, where it was finally roasted and ground. There is a good market for it in the Southern States, and now that the devastation caused by the war has practically put an end to the cultivation of many crops—such as beetroots, chicory, flax, and others—in Belgium and France, it would seem that there is a good opportunity for Queensland farmers to enter upon chicory cultivation, and retain a business afterwards, which cannot but be profitable.

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## COTTON INDUSTRY IN TEXAS, U.S.A.

In May, 1914, a well-known cotton-grower and cotton ginnery proprietor of Childress, Texas (Mr. E. E. Wood), visited Queensland for the purpose of ascertaining the cotton-producing capabilities and climatic conditions of the State, with a view to returning, with a number of American cotton-growers, to enter on the industry on a large scale. Subsequently a communication was received by the Hon. W. H. Barnes, who at the time was Acting Premier of Queensland, from the then Prime Minister of the Commonwealth of Australia, the Hon. J. Cook, forwarding a letter written by the Acting British Consul at Galveston, Texas, U.S.A., furnishing replies to certain inquiries made by the Dominions Commission in regard to the cotton-growing industry in the United States. This information was published in the issue of the "Queensland Agricultural Journal" for March, 1914, to which those of our readers who are interested in the cotton industry are referred.

We lately received a letter from Mr. Wood, part of which reads as follows:—

"Under separate cover am sending you some papers that you may get a fair idea of conditions here, also some photos of the ginnery in operation. The large man (in the picture on the wagon) and his five sons are much interested in Queensland, and a fine family are they. Have ginned 80 to 150 bales cotton for him the past five years. He, like myself and others that would go, are tied to property that at the present cannot be changed for money or paper security. Notwithstanding the low price of cotton, the farmers in this country are in easy condition. The drop in the price of cotton from 13 cents to 6½ and 7 cents was a sore disappointment to the grower.

Plate 9.—Mr Wood's Cotton Ginnery, Childress, Texas, U.S.A.

"For cotton ginners it was a very profitable season, also for pickers. My plant has ginned 1,450 bales to 18th December—eighty days' operation.

"We have had bad weather since for ginning, the ground being covered with snow, and it looks like it will be March or April before the remainder (about 20 per cent.) of crop will be in.

"I believe I will be able to dispose of my gin property as it has shown to be a good money earner. My other property, land and city property (should I leave), would be unsold. War conditions have stopped investments in real estate, and money is available only for keeping business going. However, prospects are good (some say for boom) for better times ahead, but you know the majority of Americans are optimists.

"I started a cable to your Under Secretary for Agriculture in October, offering some good cotton seed cheap, but it was turned back at New York by the censor. Also it would have cost more money to take it through London. They only wanted twenty-five dollars! Cotton seed has more than doubled in price since, and it would now take from 1·25 (5s. 2d.) to 2.00 dollars (8s. 4d.) per bushel to get good seed. Gin-run seed about 40 cents (1s. 8d.) bushel. Queer these war lords can't read! By this time, I suppose, Australians have got over the shock and excitement of war and settled down to make a clean job of it.

"I enclose you letter received from chance acquaintance I made on train from 'Frisco home; he got the Australian fever from me. I wrote him back the war could not stop the world from going on, and that after it was over there would be millions of Europeans shifting to get away from after-war burdens, which are likely to be more unbearable than war itself.

"Should the Queensland Government organise and promote immigration along the lines of some of the large land companies (adding the cost of the service to land sold), there could be a good business from America.

"Cotton lands, no better than Darling or Peak Downs, are selling in Texas at 75·00 dollars (£15) to 150·00 dollars (£30) per acre. And there are thousands of tenants looking for the opportunity your country offers, but are too timid or not able to make the move. I hear of some scattered Australian travellers who would be glad to get back home."

The letter referred to by Mr. Wood was received from a large stock breeder in the United States (Mo.) who became very much interested in the former gentleman's enthusiastic account of the splendid stock-raising capabilities of Queensland, who would probably have been here now but for the war, which he thinks "will ruin the possibilities of Australia for a good few years to come."

## PICKING RECORD IN TEXAS.

Reports of good picking by the boys are coming in right along. Dennis Sherrell, the eleven-year-old son of D. W. Sherrell, of Tell, picked 350 lb. of cotton in one day. Cotton is fine in every neighbourhood, and the ones who get up and go after it have no trouble in getting the big weighings.

Claudie Scarlet, a ten-year-old girl, picking cotton on J. H. Andrews's farm in Garden Valley, picked 506 lb. of cotton Monday. Miss Claudie weighs only 67 lb. This is a record hard to beat, and one the boys will have to work hard to overcome.

Here in the South our chief fear now is that the European savages will quit wearing clothes.

Pickers are paid one half-penny per pound. At this rate, a family of four pickers like Miss Scarlet could earn £4 6s. per day, whilst eleven-year-old Sherrell would add 14s. 7d. per day to the family income.

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## SUNFLOWER GROWING FOR SEED.

The sunflower will grow in almost any soil and in any climate. It will bear cold or heat, drought or rain. It is subject to no disease, and to no climatic disqualification. The cultivation is very simple. As stated, the plant is not at all particular, but prefers light, rich, well-drained soil. It is advisable to sow early—say, the beginning of September—to secure perfect maturity. The quantity of seed required per acre will vary from 4 to 6 lb. It should be sown in drills, 5 ft. between the rows, and the seed drilled or dibbled in at intervals of 3 ft. The plants may afterwards be thinned out, if found necessary owing to exuberant growth, to ensure full exposure to the sun—a very necessary condition. As the plants have a habit of spreading their branches and heads in successive layers over each other, thinning is generally necessary. When 12 in. high, a slight earthing up benefits the plants. Sunflowers with many heads do not ripen the seed evenly, therefore, it is better to cultivate a species producing only one large head to each plant.

The Tall Mammoth Russian is such a variety, and may be planted closer. It produces more seed than any other sort, and can be obtained from most seedsmen in Brisbane, and probably elsewhere.

A yield of 50 bushels per acre is not uncommon under favourable conditions. The Mammoth, or Giant Russian, has often produced flower heads 15 in. in diameter and bearing over 2,000 seeds.

The leaves of the sunflower, when sun-dried and pounded, and mixed with meal or bran, make good fodder for milch cows. The oil expressed is almost equal to olive oil.

We are not sure of the wholesale price now ruling for the seed; before the war it was quoted at £12 per ton.

# Pastoral.

## THE TAPE-WORM IN QUEENSLAND.

BY W. G. BROWN, Sheep and Wool Expert

Recently, in the course of my duties, I have found that this season is remarkable for the extremly serious infestation of sheep by internal parasites. I am not able to explain why it is so. The plague is not confined to the coastal areas alone, but is found to be just as serious in the comparatively dry areas west of the Dividing Range, where only occasionally worms in sheep have given trouble in former years.

The main parasites, I find, are the stomach worm (*Strongylus contortus*), and in some places associated with these, the nodule worm (*Oesopagostoma Columbianum*). Of these two, much has been written of late years in Queensland.

The object of this article is to point out the presence in certain districts of the tape-worm (*Tænia expansa*) in addition to the other two.

I visited a group of sheep farmers a few days ago, and after inspecting the sheep concluded that they were suffering from stomach worms. I was, however, puzzled when I learned that the owners had thoroughly drenched these sheep only a few days before with a bluestone drench. Plainly there was no improvement, especially in the lambs, of which two had died overnight, in addition to others which had previously died. I then examined the droppings in the yard and found abundant evidence that tape-worms were present in very large numbers, and the puzzle was solved.

This evidence consisted, first, in the presence of small maggot-like, white pieces of matter which, under a magnifying glass, were seen to move slightly. Besides these, I saw one piece of a tape-worm about 10 in. long, which had broken off from the parent worm. Curtice, in his "Animal Parasites of Sheep," mentions that a tape-worm may be of any length up to 5 yards.

So it was clear that tape-worms and stomach worms together had invaded the flock under inspection. I drenched at once with arsenic and Epsom salts, and have reason to believe that most of the tape-worms were killed, for many were voided in the yards after drenching.

Owners of flocks on coastal areas, therefore, should be on the *qui vive* for this pest, and so that they shall know for what to look, I append some remarks by Curtice, with a group of illustrations by that author.

I have found the arsenical drench recommended by this Department effective against them (*see* Professor Curtice on the "Animal Parasites of Sheep," page 31).

"The tape-worm disease can be diagnosed by finding the little white, oblong tape-worms segments which are voided from the sheep, and stick to the pellets of dung. They may also be found adhering to the wool and dirt around the tail. But this is only after the tape-worms have become adult and have begun to shed segments. Though sheep often harbour tape-worms, and give no evidence of their presence until after slaughter, there are cases in which their presence is only too evident to the flockmaster. The first indications of the disease are usually unobserved, because of slow growth and the comparatively small number of parasites that may be developing. The time of growth occupies about two or three months from infection. The number of individuals may be from two or three to a hundred; but it is unusual to find more than half a dozen adults together. As many as fourteen adults have been found in a lamb four months old.

"When young the worm occupies but a small space, needs little food, and causes few vermicular contractions. In the earlier stages, it is plain that they cause but little trouble, but when they grow large they seem to fill the whole of the small intestines, and they cause the serious disturbances ascribed to them. These disturbances may be, to a certain extent, those arising from a reflex irritation of the sympathetic and spinal nerves, but most of them seem to arise from the indigestion which the worms produce.

"The worms obstruct the intestinal canal by their great mass, irritate it by their vermicular contractions, cause excessive secretion of the intestinal fluids, non-assimilation of food, and abstract nutriment from the intestinal contents for their own growth.

"The lambs become poor and hide-bound; their flanks may be either distended by gas or be tucked-up by gauntness. In the progress of the disease the animals become evidently weaker, the mucous membranes paler, and the fleece dry and harsher from the absence of yolk. The animals walk with a tottering gait. They often eat more and drink oftener than those less affected. In the severest cases the lambs grow weak and poor, diarrhœa becomes more and more pronounced, and at last they die through sheer exhaustion. While suffering from these worms they are more susceptible to the attacks of other parasites, while other diseases supervene and hasten the death of the otherwise weakened animals."

These are the words of one of the best authorities on intestinal parasites in the world, and nothing can be added to them.

I send this out because we want information as to the presence of any pest, and centralised information must result in good for the sheep-master.

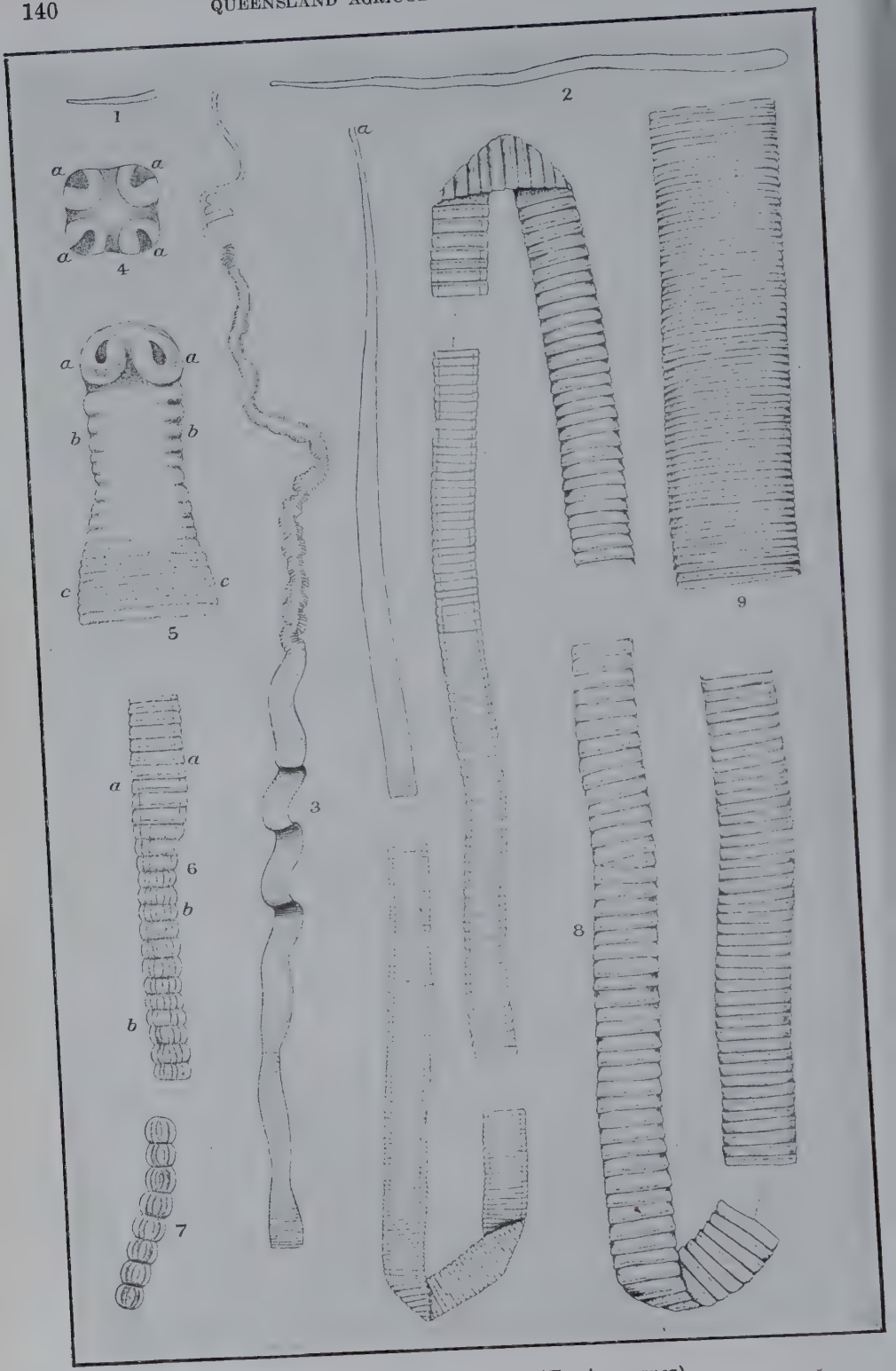


PLATE 10.—THE TAPE-WORM (*Tænia expansa*).

*TÆNIA EXPANSA*, Rod.

Figs. 1 and 2.—Young tape-worms, natural size.

Fig. 3.—Head end of tape-worm drawn to show vermicular contractions when living.

Fig. 4.—Head, top view: *a, a*, the *suckers* or *cups* by which the worm attaches itself to the intestinal walls.

Fig. 5.—Head, side view: *a, a, suckers*; *b, b, folds in the neck*; *c, c, the first segments.*

Fig. 6.—The large end of a young tape-worm: *a, a, segments which are not mature* enough to drop off; *b, b, segments ready to pass away* from the worm.

Fig. 7.—Segments or *proglottides* found separate from the worm.

Fig. 8.—An adult tape-worm drawn in sections at regular intervals apart: *a, head.*

Fig. 9.—A fragment of another worm which is not only slightly longer, but whose segments are shorter and broader.

The specimens shown in Fig. 8 could have assumed very much the same form when alive as in Fig 9.

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## ABERDEEN ANGUS CATTLE.

By P. R. GORDON.

In my contribution to your February issue on the subject of smaller grazing holdings, I instanced the Aberdeen-Angus cattle as one of the most profitable breeds to adopt on such holdings. That they are the ideal beef cattle is readily acknowledged by breeders of other beef varieties, and their most remarkable successes at all the leading fat stock shows of Great Britain and America, both before and after slaughter, is the strongest evidence of the fact. It is not intended in this short paper to go into the antiquity of the breed. That subject has been fully elaborated in Macdonald and Sinclair's interesting history of the breed, published in 1882. At what period in their history their horns disappeared is still matter of conjecture, but that they sprang from a horned variety is, in the opinion of naturalists, proved by the conformation of the skull. On that subject Darwin, the celebrated philosopher and naturalist, says it has been due to "what we may call, in our ignorance, spontaneous variation." The authors of the history referred to went into this branch of the subject at great length, and arrived at the conclusion that this beautiful race is a direct branch of the aboriginal horned cattle of Scotland thrown off by those sudden "proper," "spontaneous," or "accidental" "organic changes," and they go further and say the breed is indigenous to the very districts which still form its headquarters—the north-eastern counties of Scotland, with Forfar and Aberdeen as chief centres. The breed takes its sub-title from the old district of Angus, now mainly comprised in the county of Forfar, where they are known as "doddies," while in Aberdeen they are familiarly known as "humlies." A variety of polled cattle has existed in Aberdeen from time immemorial. Little attention had been given to the improvement of cattle till after the middle of the eighteenth century. It was about the year 1808 that Hugh Watson, of Keillor, in

Forfarshire, commenced to improve the breed, and he in many ways resembled his great prototypes in the Shorthorn world, the brothers Colling, who had commenced the improvement of Shorthorns in 1780, just twenty-eight years before the famous Keillor herd was formed. In his work on "Cattle and Cattle Breeders," Mr. McCombie generously acknowledges that "among those who have distinguished themselves as breeders of Aberdeen and Angus polled cattle, the late Hugh Watson, of Keillor, deserves to be put in the first rank. We all look upon him as the first great improver, and no one will question his title to this distinction. There is no herd in the country which is not indebted to Keillor blood." His method of operations as an improver was similar to that of the first greater improvers of the Shorthorns—namely, "put the best to the best, regardless of affinity or blood." He bred from none but the best—that is, those that came nearest to his ideal—and he did not care whether these were closely related or not. The history of the time shows that many took up the breeding of the improved Aberdeen-Angus cattle, among the number being many who afterwards became famous as Shorthorn breeders. But after the fame of the improved Shorthorns, after Colling's great sale in 1810 (when Comet reached 1,000 guineas), Shorthorns were introduced in great numbers into Scotland, and the black polls receded into partial obscurity, and then it was discovered that the Shorthorn bulls mated with polled cows produced better butcher cattle than had yet been known—animals remarkable alike for aptitude to fatten, wealth of flesh, constitution, and quality of beef. Crossing in this fashion, therefore, became almost a craze; and this craze also invaded Angus, and there induced many farmers—much to their own chagrin afterwards—to allow their excellent herds of purebred polled cattle to degenerate into stocks of ever-varying crosses. Fortunately, however, in both the great strongholds of the breed there were a number of shrewd, far-seeing men who recognised the danger which threatened the native polled cattle, and who determined to disregard the popular taste, and to maintain more jealously than ever the purity of the polled race. It was then that the late Mr. William McCombie, of Tillyfour, Aberdeenshire, stood head and shoulders over all others as the great deliverer of the polled race. It is doubtful whether any other single individual has ever done more to improve and popularise any breed of live stock than Mr. McCombie did to improve and make known his pet polled cattle. Taking up the work so systematically commenced by Hugh Watson, Mr. McCombie carried it on with a skill and success that have few equals, and that will cause his name to be handed down to posterity. It has been truly said that what the Collings's did for Shorthorns, Hugh Watson did for the polled breed, and it might with equal truth be said that what Amos Cruikshank has been to the "red, white, and roan," Mr. William McCombie was to the "glossy blacks." The Tillyfour herd dates from 1830, and was finally dispersed in 1880, a few months after the death of its worthy owner. His success in the showyard has few parallels in the history of farm stock. In the third edition of his volume, entitled "Cattle and Cattle Breeders," no fewer than seventeen pages are occupied by a mere record

of his premiums won by animals belonging to the herd prior to 1875. He several times entered international contests in France, and on all occasions returned with new laurels. But probably the crowning victory of his life was achieved at the great International Exhibition held in Paris in 1878. On that occasion, in addition to several class honours, he carried off with a group of beautiful young polled cattle, all bred at Tillyfour, not only the £100 prize for the best group of cattle bred by the exhibitor in the division foreign to France, but also the £100 prize "for the best group of beef-producing animals bred by the exhibitor." In fat stock as well as breeding shows he often proved invincible, and altogether it may safely be said that the high reputation which the breed has deservedly gained beyond the bounds of the British Empire has, to a very large extent, been fostered by the remarkable showyard achievements of the Tillyfour herd. It would occupy needlessly too much space to enumerate all the noted herds of Aberdeen-Angus cattle that have been established in Scotland, England, Ireland, North and South America, South Africa, and many other places comparatively little known to the inhabitants of this side of the globe, but special notice must be made of the premier polled herd of the present day, that of Ballindalloch, on the borders of the two counties of Banff and Moray. Of the early history of this herd little is definitely known. The influence that this herd has exercised in the improvement of other stocks can hardly be over estimated. The fame of the herd is equally great in the breeding paddock, the showyard, and the sale ring. In 1850 Sir John Macpherson Grant, then owner of Ballindalloch, bought two animals, a cow and bull, from Mr. McCombie. At his death his successor, Sir George Macpherson Grant, went to reside at Ballindalloch in 1861, and it was then that the improvement of the herd received that attention which made it take the leading position in the county. The first animal purchased by Sir George was Erica (843), acquired at the Earl of Southesk's sale in 1861 for fifty guineas. Jilt (973), another remarkably good breeding cow, was purchased from Mr. McCombie in 1867 for seventy guineas. Another good addition was Sybil (974), for sixty-three guineas. She gained almost every prize she competed for. He also acquired animals of the Pride and other noted families. The closest attention was, without intermission, bestowed on the selection of sires. Distinguished success was achieved in the building up of families; the place of honour in that respect has been accorded to the Ericas, of Keillor origin, and it has come to be regarded as one of the choicest strains of polled cattle; but there are many breeders of note who prefer the Pride of Aberdeen family of Tillyfour notoriety. Sir George M. Grant died a few years ago, and was succeeded by his son, Sir John, who continued the herd on the lines of his father; but he had a short reign; died a few months ago, and was succeeded by his only son, the present Sir John M. Grant, and some anxiety has been expressed among breeders as to whether he will continue the herd on the lines so successfully carried out by his grandfather. The great success of the Shorthorn Aberdeen-Angus cross has been referred to above. At the time it was first adopted, Shorthorn bulls were few in Scotland, and bulls of that

breed were used on the native polled cows. Experience has since shown that the greatest success results by the use of Aberdeen-Angus bulls and Shorthorn cows in the production of what has become generally known as the favourite butchers' beast, the "blue roan." The better to understand the true important points of the male Aberdeen-Angus, I submit a photograph of the bull Jeshurun, a one-time champion of the Scottish National Show, and perhaps the best bull of his century, a study of which cannot be otherwise than profitable to breeders of beef cattle generally. Passing over the minor points, the shoulder-blades

PLATE 11.—"JESHURUN," CHAMPION ABERDEEN-ANGUS, HIGHLAND SHOW

should lie well backwards, fitting neatly into the body, and not lying awkwardly outside of it. They should show no undue prominence on the shoulder top, on the points, or at the elbow. An upright shoulder in cattle is generally accompanied by a light waist—an important and in all breeds a much too common defect. The chest should be wide and deep to give plenty room for lung development. The bosom should stand well forward between the fore legs, and underneath should be well covered with flesh and fat. *The crops should be full and level, with no falling off behind them.* The last sentence is italicized because it is a weak point in many of the Shorthorn bulls introduced into Queensland from what are called the fashionable herds of Victoria. The ribs should be well sprung, springing out barrel-like, and neatly joined to the crops and loins; the back level and broad; the loins broad and strong; the hook-bones not too wide—narrower than in an average Shorthorn; the

quarters long, even, and rounded, with no hollow from the hooks to the tail. On both sides of the tail the quarters should turn away in a rounded manner, swelling out downwards and ultimately passing into thick deep thighs. The bottom line should be as even as the top and side lines. All over the frame there should be a rich and even coating of flesh. Even the hook-bones and other prominent parts should be well covered with flesh; and, above all, there should be no patchiness —no hollows, and no rolls of hard flesh, with spaces of soft useless fat between them. Cows differ considerably in character. The head is finer, the skin not quite so thick, the udder large, and milk-vessels large and well defined. The illustration of the bull accompanying these notes comes up to Bakewell's principles of breeding: "To get beasts to weigh where you want them to weigh," in the roasting instead of the boiling pieces; that the shape should give "the greatest value in smallest compass"; that the shape that does that is correlated with a hardy constitution and great readiness to fatten; that "the smaller the bone the truer the shape." The superiority of the black polls over most other breeds for the butcher's purpose lies in the excellent quality of beef, and in the high percentage of dead meat to live weight; the beef is very well mixed and contains a greater proportion of compact, finely-grained flesh, and less soft, coarse fat than most other kinds of beef. Inside the carcass is usually well lined with fat of the finest quality, while in the density and quality of the carcass itself, the breed may fairly claim the premier position among all the leading breeds of cattle. Some place the small Devon breed alongside, if not even before, it in this respect; but, with that exception, perhaps there is no other breed that will, on an average, yield so high an average yield of dead to live weight. In butchers' phraseology, it "dies" well and "cuts up" admirably.

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## HANDY SHEEP YARDS.

Mr. W. G. Brown, Sheep and Wool Expert of the Department of Agriculture and Stock in this State, supplies the accompanying diagram of an effective and cheaply erected sheep yard. He says:—

The accompanying plan, drawn from scale, is a handy set of yards for owners of flocks of under 2,000 sheep.

They may be made of round stuff, 9-ft. panels and 4 ft. high. That means the posts shall be 6 ft. long and 2 ft. in the ground.

It is taken from the "Journal of Agriculture," New South Wales.

A similar set is in use at Gindie State Farm and has been found very handy to work.

The capacity is about 1,500 to 1,700 sheep comfortably filled.

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF FEBRUARY, 1915.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Bella | Ayrshire | 19 Jan., 1915 | 740 | 3·8 | 32·93 | Cows fed on natural pasture only. |
| Honeycomb | Shorthorn | 27 July 1914 | 556 | 5·0 | 32·80 | |
| Nellie II. | ,, | 20 July ,, | 682 | 3·8 | 30·34 | |
| Butter | ,, | 20 Nov. ,, | 462 | 3·8 | 28·58 | |
| Sweet Meadows | Jersey | 28 July ,, | 375 | 6·4 | 28·45 | |
| Lady Dorset | Ayrshire | 20 Sept. ,, | 468 | 5·1 | 28·23 | |
| Madam Melba | Holstein | 8 Sept. ,, | 727 | 3·3 | 27·99 | |
| Miss Jean | Ayrshire | 24 Nov. ,, | 594 | 3·9 | 27·14 | |
| Burton's Lily | Shorthorn | 17 Nov. ,, | 575 | 4·0 | 26·99 | |
| Silver Nell | ,, | 5 Oct. ,, | 533 | 4·2 | 26·27 | |
| Miss Melba | Holstein | 6 Mar. ,, | 785 | 2·8 | 25·56 | |
| Glen | Shorthorn | 26 Oct. ,, | 570 | 3·8 | 25·38 | |
| Daisy | Holstein | 26 Nov. ,, | 734 | 2·8 | 23·88 | |
| Lady Margaret | Ayrshire | 19 June ,, | 496 | 4·1 | 23·87 | |
| Violette's Peer's Girl | Jersey | 22 Oct. ,, | 437 | 4·6 | 23·67 | |
| Simple Interest | ,, | 24 Nov. ,, | 502 | 4·0 | 23·54 | |
| Countess of Brunswick | Shorthorn | 27 July ,, | 499 | 4·0 | 23·42 | |
| Bluebell | Jersey | 27 May ,, | 439 | 4·5 | 23·26 | |
| Lady Melba | Holstein | 6 Mar. ,, | 585 | 3·4 | 23·21 | |
| Rosebud II. | Ayrshire | 20 Sept. ,, | 509 | 3·7 | 22·05 | |
| Special Edition | Jersey | 19 Dec. ,, | 450 | 4·0 | 21·10 | |
| Dolly | Shorthorn | 19 Dec. ,, | 604 | 3·0 | 21·09 | |
| Lark | Ayrshire | 27 July ,, | 366 | 5·5 | 20·79 | |
| Lowla II. | Shorth'rn-Ayrshire | 23 Sept. ,, | 492 | 3·6 | 20·73 | |
| Lady Lil | Jersey | 22 Aug. ,, | 353 | 5·6 | 20·66 | |
| Lucinda | Ayrshire | 20 Sept. ,, | 486 | 4·3 | 20·58 | |
| Princess Kate | ,, | 20 Sept. ,, | 361 | 5·5 | 20·46 | |
| Miss Lark | ,, | 31 Oct. ,, | 466 | 3·7 | 20·20 | |
| Burton's Lady | ,, | 23 July ,, | 506 | 3·4 | 20·10 | |

## ORIGIN OF THE ILLAWARRA BREED OF DAIRY CATTLE.

Relative to the origin of the Illawarra breed of dairy cattle, Mr. E. Graham, Government Dairy Expert, writes:—

There is available no absolutely authentic information relative to the origin of the now generally recognised Illawarra breed of dairy stock, and although quite a number of theories have been advanced in explanation of the foundation of the breed, the evidence in support of the claims made is more or less of a circumstantial nature. However, it is definitely known that in the early history of Australia dairying pursuits were restricted exclusively to the Illawarra district of New South Wales, and

the primary importations of cattle to Australia comprised chiefly the Shorthorn, Ayrshire, and Devon breeds. There were few opportunities offering for the introduction of new blood into the dairy herds, and naturally it followed that the dairy farmers had by compulsion to utilise stock raised within their immediate district, and descended from representatives of the breeds mentioned above.

Consequently it is obvious that the Illawarra must necessarily be a blend of the Shorthorn, Ayrshire, and Devon breeds, with a probable further admixture of other breeds of dairy cattle that were known to have been imported in lesser numbers and at a comparatively later period.

After persevering for some considerable time with the breeding of stock on the lines indicated, it was ultimately claimed that a distinctive breed of dairy stock was evolved, and this particular type of dairy animal was designated the Illawarra, an adoption of the name of the district wherein the representatives of the breed were primarily developed.

There is in existence an Illawarra Breeders' Association and Herd Book, and admirers of this class of dairy animal are attempting to further the interests of the breed throughout the Commonwealth, and possibly the secretary, Mr. R. S. Maynard, 303 Queen street, Brisbane, would, upon application, supply you with information relevant to the origin of the breed.

## DAIRY SALTS.

By E. GRAHAM, Dairy Expert, Department of Agriculture and Stock.

A deal of valuable work in connection with the analyses of dairy salts has from time to time been performed by the Agricultural Chemist (Mr. Brünnich), and the results of that officer's determinations and comments relative to the composition and characteristics of the various brands of dairy salts analysed, have appeared in the columns of the "Agricultural Journal."

It is gratifying to know that the recommendations of the Agricultural Chemist have been so fully adopted by manufacturers of dairy products, and to-day dairy factories are almost without exception using a chemically pure salt in the manufacture of their goods.

Recently another "brand" of salt has been placed on the market, and from the result of the analysis of the product it is of a high standard in quality, and in composition it approximates the best salt hitherto procurable in this market.

However, in the introduction of this particular salt, certain claims have been made in its favour, which, if accepted, are not likely to serve the best interests of the dairying industry in this State.

One of the alluring statements advanced is that by the use of this particular salt in the salting of butter it is possible to appreciably increase the amount of "overrun" at the butter factory, yet in no way detract from the quality and flavour of the butter subjected to the treatment.

For the purpose of illustrating the similarity in the composition of this salt as compared with that of the finest dairy salts used in our butter factories, the following results of the analyses made of the salts by the Agricultural Chemist are given:—

ANALYSES OF DAIRY SALTS.

| | Lymm Brand. | Leslie Brand. |
|---|---|---|
| Sodium Chloride | 99·83 | 99.68 |
| Sodium Sulphate | Nil. | Nil. |
| Calcium Sulphate | Nil. | ·12 |
| Magnesium Chloride | Trace | ·03 |
| Insoluble Matter | ·05 | Nil. |
| Combined Water | ·03 | ·14 |
| Moisture | ·09 | ·03 |
| Total Water | ·12 | ·17 |

The physical condition of the salts is identical, the small granules of both salts being of cubical form, and the even shape of the crystals denotes the probability of both salts being obtained by a very similar process of crystallisation.

Needless to remark, the percentage of sodium chloride contained in a commercial salt is an index of its purity, quite irrespective of the primary source from which the salt is obtained (either sea water or salt mine), and with salts so kindred in their chemical constituents as the foregoing, it is ridiculous to expect that any manifest difference in the behaviour of the respective salts would be found upon their being introduced into butter under identical conditions.

The intrinsic value of both salts is almost equal, and from a commercial standpoint the market quotations for both salts should be in similar agreement, allowing possibly for fluctuations due to the conditions of ordinary trade.

The salt under review has been subjected to practical tests at one of our butter factories, and through the courtesy of the manager of the company concerned, the results of several tests carried out at the factory under the supervision of the manager are available.

*Test No. 1.*—In this instance, sample No. 1 represents butter salted with "Leslie" salt, and No. 2 was salted with "Lymm" salt, both under ordinary working conditions. On the day's output of butter, that salted with "Leslie" salt shows 1 per cent. higher "overrun."

Reference to the result of the analyses of these samples of butter made by the Agricultural Chemist proves that the nature of the salt utilised was not responsible for the increased "overrun," the determinations by that officer being:—

| Butter. | Sample No. 1. | Sample No. 2. |
|---|---|---|
| Moisture | 14·27 | 14·86 |
| Salt | 1·58 | 1·44 |
| Curd | ·46 | ·70 |
| Fat | 83·69 | 83·00 |

*Test No. 2.*—A quantity of cream was churned, the butter-milk drained off, and the butter in the churn washed preparatory to salting, then 292 lb. of the butter was placed on a butter-worker and 292 lb. lodged on another "worker." To the butter on each worker was added 12 lb. of "Lymm" and "Leslie" salts respectively. Both butter-workers

were set into operation, and the process of working the butters was continued for exactly the same space of time. Upon completion of the working the butters were weighed separately in bulk. The weight of the butter salted with "Lymm" salt was 278 lb., and the weight of the butter salted with "Leslie" salt was 276 lb.

The result of the analyses of these butters, as provided by the Agricultural Chemist, is as follows:—

| Butter. | Sample No. 1A (containing "Lymm" Salt). | Sample No. 2A (containing "Leslie" Salt). |
|---|---|---|
| Moisture | 12·68 | 12·95 |
| Salt | 2·27 | 2·05 |
| Curd | ·57 | ·55 |
| Fat | 84·48 | 84·45 |

*Test No. 3.*—Two parcels of cream were selected. One comprised 17 cans and the other 22 cans of cream. The cream was duly weighed, sampled, and tested by the Babcock method. After cooling, &c., the cream formerly contained in the 17 cans was deposited in Churn No. F.M.I. and made into butter.

By test results this cream was estimated to yield 680 lb. of commercial butter. The amount of commercial butter obtained from the churn was 704 lb. In the salting, 40 lb. of "Leslie" salt was added.

The cream from the 22 cans was placed in Churn No. F.M.2 and made into butter under churning conditions similar to No. F.M.1.

By test calculations the commercial butter yield from this cream was 702 lb., and the churn result was 720 lb. commercial butter.

In salting, 32 lb. of "Lymm" salt was added.

The respective salts were added in the ratio of about 6 and 4½ per cent., and although added to the butter in smaller percentage, the incorporation of the "Lymm" salt is shown to be comparatively higher than that of the other salt used.

Samples of these butters were analysed by the Agricultural Chemist, and the results are given below, together with comments made by that officer.

| Butter. | Sample F.M. 1("Leslie" Salt, added in the ratio of almost 6 per cent.). | Sample F.M. 2 (" Lymm" Salt, added in the ratio of 4¼ per cent.). |
|---|---|---|
| Moisture | 15·80 | 15·69 |
| Salt | 2·38 | 2·84 |
| Curd | ·66 | ·71 |
| Fat | 81·16 | 80·76 |

"Butters are too salty for ordinary trade purposes, and although below 16 per cent. of moisture, both butters would be condemned for export as being below standard in butter fat."

There still exists a need for dairy factories to use only a chemically pure dairy salt, and it is a matter for regret that salt of Australian origin is not to be recommended in this connection, and until such time as an improvement is effected in the quality of Australian salt and a chemically pure salt produced within the Commonwealth, dairy companies will be obliged to procure their supplies of salt from oversea sources.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, FEBRUARY, 1915.

Four thousand four hundred and forty-seven eggs were laid during the month, as against 3,643 for the corresponding month last year. This is very good laying for February, being an average of 111·2 per pen. Some of the competitors are doing remarkably good work, while others are moulting heavily and appear to have nearly finished laying. In J. M. Manson's No. 2 pen all the birds are in moult. It will be noted that there are only 62 eggs difference between the first five pens. Marville Poultry Farm wins the monthly prize with 140 eggs. The following are the individual records:—

| Competitors. | Breed. | Feb. | Total. |
|---|---|---|---|
| A. T. Coomber | White Leghorns | 122 | 1,450 |
| Moritz Bros., S.A. | Do. | 128 | 1,434 |
| Loloma Poultry Farm, N.S.W. | Do. | 119 | 1,417 |
| T. Fanning | Do. | 104 | 1,391 |
| Geo. Tomlinson | Do. | 130 | 1,368 |
| Cowan Bros., N.S.W. | Do. | 109 | 1,330 |
| Marville Poultry Farm, Victoria | Do. | 140 | 1,325 |
| R. Burns | Black Orpingtons (No. 1) | 115 | 1,320 |
| A. H. Padman, S.A. | White Leghorns | 128 | 1,320 |
| A. F. Camkin, N.S.W. | Do. | 117 | 1,319 |
| Mrs. Munro | Do. | 126 | 1,314 |
| Loloma Poultry Farm, N.S.W. | Rhode Island Reds | 97 | 1,302 |
| T. Fanning | Black Orpingtons | 132 | 1,300 |
| E. Le Breton | White Leghorns | 109 | 1,295 |
| Kelvin Poultry Farm | Do. | 93 | 1,290 |
| E. V. Bennett, S.A. | Do. | 131 | 1,289 |
| Derrylin Poultry Farm | Do. | 129 | 1,287 |
| Mrs. Beiber | Brown Leghorns | 111 | 1,268 |
| F. McCauley | White Leghorns | 128 | 1,268 |
| R. Burns | Black Orpingtons (No. 2) | 106 | 1,264 |
| R. Burns | S. L. Wyandottes | 117 | 1,261 |
| J. T. Coates | White Leghorns | 123 | 1,260 |
| J. Franklin | Do. | 111 | 1,243 |
| J. R. Wilson | Do. | 102 | 1,234 |
| J. T. Coates | Black Orpingtons | 104 | 1,225 |
| J. M. Manson | White Leghorns (No. 1) | 106 | 1,223 |
| J. Zahl | Do. | 129 | 1,219 |
| G. E. Austin | Do. | 108 | 1,219 |
| J. Kilroe | Do. (No. 2) | 105 | 1,210 |
| Range Poultry Farm | Do. | 118 | 1,198 |
| D. Moreton, N.S.W. | Do. | 98 | 1,171 |
| R. Jobling, N.S.W. | Do. | 72 | 1,169 |
| J. Gosley | Do. | 82 | 1,169 |
| J. D. Nicholson, N.S.W. | Do. | 94 | 1,157 |
| J. N. Waugh, N.S.W. | Do. | 119 | 1,146 |
| Mrs. Bradburne, N.S.W. | Do. | 110 | 1,145 |
| J. Murchie | Brown Leghorns | 107 | 1,124 |
| J. Kilroe | White Leghorns (No. 1) | 96 | 1,114 |
| C. M. Jones | Do. | 79 | 1,105 |
| J. M. Manson | Do. (No. 2) | 93 | 1,094 |
| Totals | | 4,447 | 50,237 |

# State Farms.

## NOTES FROM KAMERUNGA STATE NURSERY, CAIRNS, JANUARY AND FEBRUARY, 1915.

Mr. C. E. Wood, manager, reports:—

Rainfall for the month of January, 2·73 in. Number of days on which rain fell was 14.

Maximum reading, 101 degrees Fahr., on the 2nd instant.

Minimum reading, 69 degrees Fahr., on the 14th instant.

Rainfall for January, 1914, 28·97 in., which fell on 14 days.

From the above it will be seen that the new year has started with a very dry month, being, in fact, the second driest January of the 26 for which records have been kept.

The heat during the first few days of the month was intense.

Work amongst young coffee consisted in keeping clean round plants and scything the remainder of ground. Disbudding on tips of primary branches was also carried out.

*Vanilla.*—Training vines where necessary. Growth still continues good.

As is usual at this time of year, the principal work is scything and keeping down weeds.

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Rainfall for month, 5·55 in. Number of days on which rain fell, 9. Extreme maximum temperature, 102 degrees F. on the 10th instant; extreme minimum temperature, 67 degrees F. on the 17th instant. During the first half of the month we had some of the hottest weather ever experienced in this district, and the total rainfall for the two months of this year is the lowest on record.

*Coffee.*—Instead of continuing to keep down weeds, &c., by using the scythe—this method being best during the heavy rains—all the ground has had to be clean hoed, all grass and weeds left to wither and shade the ground.

*Vanilla.*—During the month 500 cuttings were taken for planting up a demonstration plot at Babinda, near the Russell River; another 500 was supplied to a settler who has started in this district; applications for smaller quantities were also received and supplied, which goes to show that some practical interest is being taken in the cultivation of this valuable product.

A tree which bore fruit this month was the longan (*Nephilium Longanum*), a fruit closely allied to the litchi. The fruit of the longan varies in quality on different trees—as also does the litchi—and while at its best it cannot compare with the litchi, it is still a very palatable fruit and is evidently relished by the Chinese, as they will give 3d. per lb. and do the harvesting. Unfortunately, owing to high winds, and the attacks of various beetles, most of the crop was destroyed, otherwise the crop from our one tree would have been worth about £2. Apart from its fruit, this tree, although a slow grower at first, eventually makes a very handsome shade tree.

# The Orchard.

## CULTIVATION OF PASSION VINES (*PASSIFLORA EDULIS*).

By C. ROSS, F.R.H.S., Instructor in Fruit Culture.

Considerable attention has been given to the cultivation of this delicious fruit for many years in this State, but for the most part in a very slovenly manner.

Being a rampant grower, it often presents a jumbled up mass of twisted vines and foliage, rambling over old fences, outhouses, and trees, and absolutely untrained. Passion fruit, when properly grown, is one of the most remunerative of crops, and can be grown at a minimum of expense. In some cases it has yielded up to £100 per acre in the second year. Passion fruit is sometimes grown in conjunction with citrus trees, and this is a very good and economical method, provided the citrus trees are grown on a good sandy loam not far from the coast and planted at not less than 25 ft. apart—30 ft. would be better.

If grown in this manner the vines should be rooted out after the second or, at latest, the third crop is gathered, as by that time the citrus trees will be bearing fruit and will require all the sustenance the land can provide. In any case, the passion vines should receive annual dressings of fertilisers from the time they are planted.

The winter crop pays best, and situations should be chosen that are not subject to keen frosts.

As most of our coastal areas are deficient in lime, a good dressing of half a ton or more per acre would be beneficial, applied in the form of lime screenings or fresh burnt lime. It should not be ploughed under, but broadcasted and harrowed in.

Seeds should be saved from the best fruits and raised in seed beds, boxes, or pans in July and August. When the seedlings are strong enough to handle, say, from 6 in to 12 in. high, they should be planted out—during September or whenever the weather is favourable in early spring. Sheltering and watering may be necessary until they are well established, and a good thick mulch put round the plants during the first year's growth.

Lay out the ground by erecting ordinary split posts as in fencing (*i.e.*, flat sides opposite), about 4½ to 5 feet above ground.

The posts at each end of the row should be well strutted, and the intermediate posts placed at distances of from 15 to 20 ft. apart. The space between the rows should be at least 10 ft., to allow of cultivation, air, and sunlight. Along the tops of the posts strain two No. 8 parallel wires 6 or 7 in. apart.

Plant the young vines 12 to 15 ft. apart immediately under the wires, and train a single stem to a small sapling, allowing no laterals until the wires are reached, then pinch out the top and train one or two of the subsequent leaders to each side of the main stem. Where ties are

necessary, plenty of room should be allowed for expansion. The vines are voracious feeders and will need abundance of nitrogenous aliment, especially if an off season crop is wanted. Very little attention, except the regulation of growth, will be required the first season. During the second season, laterals will be produced, which will reach to the ground in the form of a screen or curtain, on which the fruit is borne.

For the production of a winter crop, prune off the laterals about 1 ft. beneath the wires in early November, and manure the whole surface with a complete commercial fertiliser, or according to Mr. Brünnich's formula, *i.e.*—

4 to 8 cwt. blood and bone manure,
1 to 2 cwt. superphosphate,
1 to 2 cwt. sulphate of potash,
} per acre,

according to the quality of the soil.

It is preferable to give this dressing twice—half the quantity immediately after pruning, and the remaining half before the end of the summer rains, about March. A fair crop will be gathered during the second season, but the highest prices will be commanded during the following winter. The custom in vogue is to use the long quarter-case, but the flat case is preferable. A better pack is secured and the fruit is exhibited to the best advantage. The following is the regulation size of the flat quarter-bushel case:—$13\frac{3}{4}$ in. long by $10\frac{1}{8}$ in. wide by 4 in. deep, inside measurement. This will hold three tiers of first-grade fruit. No fruit pays better to grade and pack carefully. The first grade should be the largest, well coloured, and perfect fruits; the second grade the same only smaller, but perfectly even. All culls, if sound, should be made into a third grade.

The passion vine is not a long lived plant, and after the third or fourth year generally succumbs to the attack of a parasitic fungus which appears in yellowish-brown spots on the foliage, and as the malady progresses the fruit shrivels and the branches die back. Should the disease appear in the earlier stages of growth, it may be controlled and checked by periodical sprayings of Bordeaux mixture or sulphur-lime wash.

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## THE WAR OF THE APPLES—STANTHORPE V. AMERICAN. ITS CAUSE AND ULTIMATE EFFECT.

By J. HENDERSON.

The cause of the above war is briefly this:—For several years past, some of the Brisbane fruit merchants have been carrying on what might well be termed a roaring and profitable trade in American apples. But just as these merchants reach the heyday of perfection, a small cloud makes its appearance on the horizon. To be more concise, this small cloud represents the apples grown by Queensland's sons of toil on the great granite belt of the Stanthorpe district. On this belt the apple grows to the highest state of perfection. Men who have travelled the world over admit this fact; fruit merchants and fruit growers from the

Southern States admit it, and the man in the street admits it. But the city fruit merchants who are dealing with American apples will not admit this fact, so the war continues, and may it continue a little longer, but with tenfold fierceness, for on the fierceness of this battle depends the measure of perfection to which the apple industry of the Stanthorpe district will attain. Legislation cannot effect a cure or in any way give relief. It rests entirely on the skill and energy applied by the growers themselves. And when they emerge from the struggle as conquerors, then, and not till then, will they bless the day when the American apples glutted the Brisbane markets.

Keen competition is the life of trade, and as far as the quality of Stanthorpe apples is concerned, they need have no fear. But quality is not everything, for very leaky houses can be built with first-class materials. So all ye growers in the granite belt, note, that if you wish to obtain the highest value for your apples, you must learn how to prepare and place them on the market. There must be no shoddy or slipshod work, for therein lies the secret of success. Make a beginning at once. Plant only varieties of the highest qualities; use the most up-to-date methods in harvesting, grading, packing, and marketing your apples; and remember to discard all small, worthless, diseased, damaged, and badly deformed apples, for the inclusion of such will certainly reduce the value of the case. Growers in this district who are working on the above lines were getting as high as 12s. 6d. per case for Jonathan apples in the Brisbane markets last month, and as soon as the apple growers of the Granite Belt carry on their industry on the above lines, then, and not till then, will the American apple cease to compete with the apple from the Granite Belt.

During the present season I have seen far too many cases of apples leaving this district that contained grades ranging from $\frac{3}{4}$ in. to 4 in., and which were not packed, but simply thrown into the cases. On the other hand, I have seen apples of high quality, which, with proper handling, would have commanded a high price, but which were so badly bruised in gathering and casing that they were almost worthless. Remember to handle apples more carefully than eggs.

## STAGGERS IN HORSES.

In treating staggers in horses, the cause of the trouble must first be ascertained. In the majority of cases it is due to dietetic causes, —viz., eating some poisonous weed. If this be the case, all animals should be removed into a fresh paddock where there are no poisonous weeds. In some cases it is due to inflammation of the brain, in which case the disease is diagnosed by blindness, dizziness, running round in a circle. In such cases, a dose of physic consisting of aloes should be given at once. Bleeding is often resorted to with good results. The animal should be given soft bran mashes two or three times daily, with one teaspoonful hyposulphate of soda mixed in it. A plentiful supply of clean cold water is also necessary.

# Apiculture.

## ARSENICAL SPRAYS AND BEES.

"South African Gardening" (February, 1915), a very useful and interesting journal published in Johannesburg, contains the following correspondence between an apiarist at Johannesburg and the Director of Agriculture, Pretoria, which will be read with interest by bee-keepers and fruit-growers in Queensland:—

### ARSENICAL SPRAYINGS.

WHICH ARE YOU KILLING, CODLIN MOTHS OR BEES?

SIR,—During the spring of this year my attention was drawn to some incidents which, I think, merit your consideration.

In my garden at Houghton Estate, Johannesburg, I was keeping a hive of bees, and during the early spring, while the fruit trees were coming into blossom, I noticed that a very great number of my bees were dying every day. I have kept bees practically all my life, and was at a loss to understand the cause of death to practically all the bees in my hive.

The most unusual circumstance with regard to the incident was that the bees were dying on the ground in front of the hive at a distance of anything from one to ten or twelve yards.

After a very careful examination and many experiments, I could only come to one conclusion, which was that the bees were being poisoned. I then consulted with one or two friends who are also interested in bee-keeping, and one gentleman informed me, without any hesitation, that the bees were being poisoned with the arsenical spray used in connection with the spraying of fruit trees in the neighbourhood. I have since read a good deal on the subject, and am forced to the conclusion that this can have been the only possible cause of death.

In certain States in America this form of bee poisoning has become a very serious matter, and legislation in respect thereof has been passed or is in contemplation.

Most of the authorities on the subject are of the opinion that the trouble is caused by the fact that the fruit blossom is sprayed before half of the petals have commenced to fall. It is obvious that if no spraying is done until after the petals begin to fall, naturally no injury can result to the bees, because the nectar is not secreted in flowers from which the petals are falling. In other words, unless the owners of fruit orchards are made to realise that spraying before the petals have begun to fall is useless, trouble will be experienced in keeping bees in safety in any district where spraying is customary.

I should be glad if you would submit this to the consideration of the botanical experts in order to ascertain whether my assumptions with

regard to the correct time for spraying are correct, and, in any case, I should be glad to hear from you as to whether there is any remedy for this new and apparently unnecessary disease in South African apiaries.

I have, &c., (signed) ALEX S. BENSON.

The Director of Agriculture, Pretoria.

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In reply to this letter, which was referred to the Chief of the Division of Entomology, the latter wrote:—

It seems to me highly probable that the death of your bees was, as you contend, due to injudicious spraying of fruit trees with arsenical poisons. The remedy lies in educating the fruit growers and gardeners to time spraying to effect the destruction of the injurious insects they aim to destroy, and not the destruction of beneficial insects, like bees, which in their own interests it should be their aim to protect from unnecessary harm.

The sole object at Johannesburg and in most other places in the Union in spraying deciduous fruit trees while they are in blossom is for the protection of the fruit against the codling moth. There are, then, three main effects to consider, namely—

1. The effect on blossoms.
2. The effect on bees.
3. The effect on codling moth.

There is difference of opinion amongst authorities as to the effect on the blossoms, but I think it safe to assume that the effect is of little consequence and almost wholly mechanical. However, such effect as there is is undoubtedly injurious.

The effect on bees is of far greater importance, and disastrous consequences, such as you report, probably occur quite frequently, to judge by the complaints made to officers of this Division by bee-keepers and by sundry official observations. An American investigation disclosed that brood bees in uncapped cells as well as worker bees might be killed by the poison taken from the blossoms, and it was concluded "that bees are liable to be poisoned by spraying the bloom of fruit trees, the liability increasing in proportion as the weather is favourable for the activity of the bees, and that all bloom must have fallen from the trees before the danger will have passed."

The effect on the codling moth is the phase of greatest importance to the average fruit-grower, and, to express it curtly, that effect is practically NIL so far as the protection of the fruit still in the bloom stage is concerned. The poison that lodges on the blossoms is nearly all shed, and most of what remains is placed where no codling moth larva will ever find it.

It follows that the spraying of blossoms with arsenicals to kill codling moth is an utter waste of time and material, and does decided harm by exposing bees to poisoning.

The time to begin to spray trees to kill codling moth is immediately after *the blossoms have fallen*. Then poison can lodge in the little obstructed calyx cup (blossom end) of the newly formed fruit, and there

be ready for the enemy which usually enters at that point. An occasional larva may enter a forming fruit before the blossom falls, but any such one is doomed to perish through insufficiency of food if it does not soon leave, and it deserves no consideration.

In nearly all parts of South Africa, however, the blossoming period of rosaceous fruit trees is extremely protracted compared to what it is in Britain, Northern Europe, Canada, and the United States generally. It commonly happens that a goodly number of fruits have grown to be an inch or more in diameter and are infested with codling moth before blossoming has ceased. Indeed, it is not unusual for a tree to have two or three distinct blossoming periods in the one season. Under such conditions, I hold that the fruit grower should go ahead with his spraying as soon as a considerable proportion of the fruits reach the proper stage, notwithstanding the liability of poisoning some bees. If he neglects to protect the early formed fruit, he is likely to have extreme difficulty in protecting the crop from the second generation of the pest.

The principle of waiting until the majority of blossoms are off before spraying is now generally recognised in the south-western districts of the Cape, where vastly more spraying against the codling moth is done than in all the rest of the Union; and whereas damage to bees in that part was not infrequently a source of trouble ten years ago, little is now heard of it there. As time goes on the public elsewhere will get educated on the point. Legislation would help very little, but I think much is to be gained by an occasional discussion of the matter in gardening periodicals.

(Signed) C. P. Lounsbury, Chief, Division of Entomology.

## EARLY TABLE GRAPES.

*First and Second Early Grapes.*—Black Hamburgh, Chavuch, Cinsaut, Madelune Royal, Snow's Muscat, Royal Ascot, Concord, Goethe, Wilder, Buckland's Sweetwater, Chasselas, Early Sherry.

The number of plants required per acre on the square system, at 7 ft. apart, is 889; at 8 ft. apart, 680. The best system, says Mr. C. Ross, Instructor in Fruit Culture, is to plant in rows, from row to row 9 ft., and between plants in the row 7 ft. apart. The Isabella is a capital stock for European vines, and it is advised that present stocks be grafted, instead of grubbing them out. Of course, all European varieties will do well on their own roots.

### GRAPES SUITABLE FOR THE ROCKHAMPTON DISTRICT.

*Wine Grapes.*—Black Hamburgh, Snow's Muscat, Syrian, Royal Ascot, Wilson, Ione, Goethe, Gordo Blanca. Cuttings of the above may be obtained from the State Farm, Bungeworgarai, Roma, at 6s. per 100, including freight, or rooted plants from any of the Brisbane nurserymen at 5s. per dozen.

# Tropical Industries.

## NOTES ON TOBACCO CULTURE—No. 3.

By NICHOLAS SACHOULIS, Turkish Cigarette Tobacco Grower and Expert, Inglewood.

### HARVESTING.

Six weeks after topping, the crop is generally ready for harvesting. Tobacco is ripe when grown up, and the leaf shows brown spots and a rough surface. The leaf is very brittle, breaking readily when doubled up.

Now begin the most particular operations of the whole process of making tobacco, for it is now that you must fix in the leaf the desirable qualities that go to make a valuable product, such as elasticity of leaf, flavour, colour, &c. Cut your tobacco in the afternoon, but not after heavy rain, nor if dew is on the plants, neither when the rays of the sun are very hot. Rain washes the gum off the tobacco, therefore wait a few days for it to gather gum again.

In hanging tobacco on the stick, it should not be put closer than 3 to 5 inches apart, according to size of the plant.

*Remarks.*—If you desire your tobacco to have a good colour, bright, golden red and mottled, hang your sticks in the shed very close, from four to six days, till leaf and stem have become perfectly limber and yellow.

### SUN CURING TOBACCO.

Then remove your sticks on the scaffold for a week or two, hang them from 6 to 10 in. apart. When the colour is good enough and the leaf getting dry—*i.e.*, when the sap is leaving it—the poles are transferred to the shed and placed in position, there to hang till nearly all the sap has left it. In sun-curing the leaf should never be allowed to get wet either by rain or dew.

### FLUE CURING.

The leaf at the time of harvesting contains a large amount of water, but it is evident that the curing is something more than drying, for a leaf dried out rapidly by heat has few of the desirable properties of a well-cured leaf. Again, a leaf dried under the right conditions in "sun curing" weighs much less than would the same leaf if dried out quickly. The most important fact to keep in mind is that the leaf must be kept alive till the first stage of the curing is completed, till yellowing begins, and this brings us to the question of the most favourable condition for curing.

The primary object of flue-curing is to produce bright colour in the leaf, but in the drying winds of South Queensland it is becoming evident that heat has a value in the curing of dark tobacco, if for no other reason than to remove the greenness so common in much of the air-cured leaf.

Turkish tobaccos have been commonly sun-cured, but experiments conducted during the past season indicate that these tobaccos can also be cured in the flue barn. By this method the loss due to unseasonable weather is avoided, the colour is brighter and more even, and, as far as can now be judged, there is no loss in flavour or aroma. When harvesting tobacco for flue-curing we prefer to prime the leaves that are fully ripe. The tobacco is then carried in baskets to the barn, where it is tied on sticks with wire or string. The barn should be filled as rapidly as possible, for if a portion of the leaves becomes wilted while the remainder are still fresh, it is almost impossible to cure a barn of even bright colour. As soon as the barn is full, start a slow fire in the furnace, and slowly bring the barn up to a temperature of 90 degrees Fahr. A hot fire at the start will ruin much of the tobacco in a few minutes, therefore the temperature of 90 degrees should be maintained until the leaf has yellowed. When the leaf is ripe and sappy, and has been grown on a sandy soil, this will not be difficult, but where the leaf has made a slow growth and is leathery, it often refuses to colour. In the latter case increase the humidity of the room by sprinkling water on the flues until the air feels moist. The yellowing stage will require from twelve to twenty-four hours, and so long as the temperature does not run over 100 degrees, the fire will not require much attention. This, it must be remembered, is for tobacco that will not yellow, and does not apply to bright colour.

The second stage of flue-curing is that of fixing the colour at 100 degrees in four hours.

After the temperature has been slowly increasing for from fifteen to twenty hours, and the leaf has lost the greater portion of its moisture, it will begin to dry at the tips and around the edges. Where this drying is general throughout the barn, the second stage may be regarded as at an end. The temperature at this point, raised 2 degrees every hour, should be about 120 degrees Fahr.

The third stage simply consists of the rapid drying out of the leaf, and is commonly called the "killing" of the leaf. The temperature is increased from 120 degrees to 135 degrees or 140 degrees Fahr., at the rate of 4 or 5 degrees an hour, and is held at the higher temperature until the midrib is perfectly dry and brittle. During this stage the ventilators are partially open, but inasmuch as less moisture is escaping than during the sweating stage, and because of the great draught due to the heat, they are not fully open. Wide-open ventilators mean a large consumption of fuel. If the tobacco has not been primed, but the whole plant hung, the temperature is then increased to 160 degrees or 175 degrees, and continued until the stalk is dry. No moisture must be left in either the mid-ribs or stalk, as this moisture will in time run back into the leaf and result in red streaks.

As soon as the drying is finished and the fires are drawn, the leaf may be rendered pliable by running steam into the room, after which it is taken down and removed to the packing house, where it may be bulked on the curing sticks and handled at a later date.

Turkish tobacco, being light and thin, changes much more rapidly than Virginia leaf (pipe tobacco), and all the stages are of shorter duration. The same high temperatures are not required, and 120 degrees is the highest temperature that we care to use for this type of leaf. The leaf dries rapidly, and the ventilators need never be fully open. The beginner usually makes the mistake of attempting too much. A year or two is required before sufficient experience is acquired to justify the planting of large fields.

The cost of flue-curing barns need not be excessive if the farmer or his assistant does the work, but a builder or contractor expects to make a good profit, and the tenders are often enough to frighten a man out of the tobacco business.

It may interest growers to know that the barn should measure 25 ft. by 30 ft. and 20 ft. high. The cost would be from £30 to £40, and such a barn is sufficiently large of an average crop of 10 acres.

Good tobacco can only be made by good curing, and good curing can come only by experience and close observation.

## ALKALINE, ACID, AND NEUTRAL SOILS.

The above terms are thus explained by Mr. J. C. Brünnich, Agricultural Chemist:—

Most of our soils have a neutral reaction, which means that they are neither pronounced acid nor alkaline. Alkalinity in soils is caused by presence of lime salts, and in a few cases, particularly near streams of alkaline bore water, to soda carbonate. A slight alkalinity is favourable, but too much alkalinity may be detrimental to plant life. For this reason alkaline bore waters are not suitable for irrigation, although quite fit for watering of stock. To some extent such alkalinity can be improved by application of gypsum.

Acidity in soil is caused when little or no lime is present in the soil, to neutralise the acidity formed by decaying vegetable matter and the natural acidity of some weathered rocks. Too high an acidity is detrimental, and can be improved by application of lime in form of slaked lime (burnt lime air-slaked).

Capillarity of soil is the physical property which aids in the circulation of water, helps to supply the surface soil with water from the subsoil, and also allows rain water to pass readily through the soil. It depends on the mechanical composition, size of soil grains, &c. Organic matter, humus, will improve capillarity, so will drainage. A well-tilled soil should have a high capillarity, as indicated by the laboratory figure how high (expressed in inches) water will rise in soil after a certain number of hours. A sandy soil has a better capillarity than a heavy clay soil.

# Science.

## A NEW DIPPING FLUID.

By J. C. BRÜNNICH, F.I.C., and F. SMITH, B.Sc., F.I.C.

The undoubted extra efficiency imparted to arsenical solutions as toxic agents to the cattle tick by the incorporation therewith of tallow or oil soaps and Stockholm tar, has led to the universal adoption of these medicaments as ingredients of cattle dipping fluids—the tar being frequently replaced by commercial phenolic preparations—in all countries where the control of the pest is undertaken, and they are therefore prescribed as adjuncts in the dipping formula under the regulations of "*The Diseases in Stock Acts,* 1896 *to* 1898," of the Queensland Government.

The small amount of tar employed serves to impart a distinctive odour to the fluid, that renders it impalatable to stock and undoubtedly, under favourable conditions, exercises a beneficial and emolient effect upon the animal skin. Recent experiments conducted by us and described in a technical paper* indicate that it acts also as a detergent agent in hard waters, which completely throw any accompanying soap out of solution, a property not shared by simple phenolic bodies.

Tar and phenolic bodies are, however, recognised as promoting agents, especially under the influence of light, of oxidation of the arsenious acid, and consequent loss of effective strength of dips; though a subsequent investigation having shown this to be accomplished also through bacterial agency, and to be combated by action of reducing organisms that find a favourable field for activity in conditions mostly prevailing in fluids in actual use, it has not been possible to invalidate their employment on this ground.

The inclusion of emulsifying agents is necessary for the maximum effectivity of dipping fluids.

Tar and soap are, however, much the highest priced ingredients of dip mixtures, and this fact has, we believe, led to the diminution of the recommended proportions by some manufacturers of concentrates. The high price of these adjuncts, and particularly the difficulty experienced to obtain Stockholm tar of good quality at the present time, determined us to conduct experiments with commercial "bone oil" as a substitute.

**"BONE OIL"** is a bye-produce in the manufacture of bone char, and procurable in sufficient quantities from the sugar refineries operating in Australia. It is a complex material, which found application as a raw material for the manufacture of certain chemicals, and also as an antiseptic dressing in veterinary practice. Experiments showed it to

* J. C. Brünnich and F. Smith. "Factors influencing Efficacy and Deterioration of Cattle-dipping Fluids." "Queensland Agricultural Journal," vol. II., part 1, 1914 page 81.

be in the main readily emulsifiable by boiling with alkali, and the resulting solution possessed marked detergent property and retained this, in common with Stockholm tar, when compounded with hard water.

## PRACTICAL TRIAL OF BONE OIL DIP.

From this property it was expected that arsenical solutions of standard strength containing bone oil as an adjunct would prove fully effective in tick destruction, and this supposition was amply borne out in spraying and dipping experiments carried out by permission of Mr. F. Stimpson at his farm at Fairfield.

The fluid used contained bone oil at the rate of 1 gallon to 400 gallons of fluid.

Stock Inspector Carmody, under whose supervision the practical trials were conducted, reports thereon as follows:—

"..... on the seventh day after spraying the cattle were clean. The stock showed no indication whatever of scalding, which is a good feature.

"..... on Wednesday, the 16th February (third day) I examined the cattle and found that most of the ticks were dead; on the 19th instant I again examined the cattle and they were clean. The opinion I have formed on the bone oil is that it is an excellent substitute for tar, as it is not so hot. The stock showed absolutely no ill-effects, and during the test the weather was particularly hot. The stock presented a remarkably clean and sleek appearance."

The trials proved the total efficacy of the bone oil-arsenical dip, and also that the bone oil has a decided beneficial and emolient effect.

The strong, though not objectionable, odour imparted by the oil has been observed to leave dipped animals within twenty-four to forty-eight hours, and it has been definitely ascertained not to communicate noticeable odour or taint to the milk drawn subsequent to dipping from a milking herd.

The relative cost of the chemicals in the new bone oil dip is practically only one-half of those in the old standard dip, and the process of manufacture is very much simplified.

## THE PREPARATION OF BONE OIL CONCENTRATE.

Laboratory experiments have shown the following procedure of preparation of a concentrate to be both rapid and easy:—

The required amount of bone oil is heated in an open pan with one quarter of its weight of caustic soda, with stirring. After a quarter of an hour, the mass being still in condition of active frothing, the flame is withdrawn and the arsenic, previously intimately mixed in the dry powder form with a quarter weight of caustic soda, is stirred into the oil in small portions. On partial cooling the mass receives addition of sufficient water to form a soft homogeneous paste, which can be immediately dissolved in more water to produce the dipping fluid ready for use, or can be tinned as a concentrate.

The proportions of constituents recommended are:—

Arsenic, 8 lb. to 8½ lb., according to quality;

Bone oil, 1 gallon (from 9 to 9½ lb.);

Caustic soda, 4 lb.—

To make 400 gallons of dipping fluid.

As a mean of several laboratory trials the following figures may be taken as a guide in preparation of concentrate on a large scale:—

| | | |
|---|---|---|
| Taken Bone oil .. .. .. .. | 95 | parts by weight. |
| Caustic soda .. .. .. | 25 | „ „ |
| Arsenic .. .. .. .. | 100 | „ „ |
| Caustic soda .. .. .. | 25 | „ „ |
| Total .. .. .. | 245 | |

After boiling and cooling, the mass weighed 200 parts, so that 50 parts of water were added to make 250 parts of paste, which for final fluids is diluted in the proportion of 1 part of concentrate to 200 parts of water.

## PASTE V. FLUID CONCENTRATES.

The new bone oil arsenic concentrate is recommended in paste form, although it could be just as easily made into a fluid concentrate.

Pastes possess a certain disadvantage in comparison with liquid concentrates in being less easily diluted. Our prepared bone oil concentrate was found to rub down to a homogeneous liquid with cold water, but much more readily with hot water, and therefore, for the filling of dips, it is recommended to use hot water where practicable, rubbing portions of paste down to homogeneity with hot water prior to emptying into the dipping bath.

Pastes possess the following advantages:—

(1.) Perfect homogeneity allowing accurate gauging of the amount of arsenic drawn in each aliquote part of the preparation.

It is almost a matter of impossibility to draw off a small amount of fluid from a liquid concentrate and to be sure that it is of right average composition.

(2.) No liability to force and exude from containing vessels, hence permitting employment of lighter and less expensive containers.

(3.) Generally greater concentration and consequent saving of freight.

The paste as prepared has a specific gravity of approximately 1·5; hence the contents of one 4-gallon kerosene tin weigh 60 lb., and will make 1,200 gallons of dipping fluid.

The bone oil-arsenic dip must be admitted to use in officially recognised public dips and dips used for the dipping of travelling stock, on the grounds of efficiency. Its general adoption is urged on account of greater simplicity and ease of preparation, economy in handling, and greatly decreased cost.

# Botany.

## CONTRIBUTIONS TO THE FLORA OF QUEENSLAND.

By F. MANSON BAILEY, C.M.G., F.L.S., Colonial Botanist.

### Order CRUCIFERAE.

LEPIDIUM, Linn.

**L. fasciculatum,** *Thellung.* (Plate 12.) Perennial ?. Stems glabrous, suberect, branching. Leaves glabrous sessile, linear, acute, quite entire, or toothed towards the apex. Flowers small, apetalous, sepals ovate, stamens 2. Fruiting raceme exceedingly short, corymbose-capitate, almost hemispherical. Pods obovate, apex obtuse, rotundate, very slightly emarginate, base narrowed. Seeds narrow-ovoid, compressed.

Hab.: Hermitage, Warwick—One of the commonest weeds in the locality, *C. T. White,* Dec., 1912.

**L. sagittulatum,** *Thellung.* Perennial ? . Stem erect, glabrous, Leaves quite glabrous, pinnatisect, or the upper ones entire, sessile, the larger ones said to be sagittate-auriculate at the base, but not seen on our specimens. Flowers apetalous. Sepals ovate, with white margins. Stamens 2. Fruiting racemes elongate, rhachis glabrous, stout, striate. Silicule elliptic, rather obtuse at both ends, apex emarginate. Seeds narrowly ellipsoid, compressed.

Hab.: Warwick, *J. R. D. Munro.*

This plant was recorded and illustrated in the "Queensland Agricultural Journal," November, 1913, pp. 318-9, as *L. incisum,* Roth. (?); specimens have since been forwarded to the Royal Botanic Gardens, Kew, England, and determined as belonging to the above species.

### Order LABIATAE.

TEUCRIUM, Linn.

**T. argutum,** *R. Br.* (Plate 13.) Some months ago Mr. W. Brooks brought me a number of long, white, fleshy roots which he informed me were blamed by a farmer, as being harmful to his pigs, making them excited and rush about, though none died; very fragmentary specimens were brought with these, and apparently belonged to the above plant, but insufficient to speak with certainty. When recently in the Eumundi district, my assistant (Mr. C. T. White), seeing quantities of the plant growing as a weed in cultivation areas, dug up several with long, white, fleshy stolons attached at some distance below the surface of the soil; the plant readily grows from small portions of these stolons. A French botanist—L'Abbé H. Coste—speaking of the genus, says all the species are bitter, tonic, and exciting. As this stoloniferous growth seems not to have previously been noted, a figure of the plant is given herewith.

Plate 12.—Lepidium fasciculatum, *Thellung.*

*C. T. White, del.*

PLATE 13.—TEUCRIUM ARGUTUM, *R. Br.*

A—Calyx. B—Corolla. C—Seed (enlarged).

## Order PANDANACEEAE.

### PANDANUS, Linn.

**P. Cookii,** *Martelli.* Webbia, iv., 401 (1914). Leaves thickly coriaceous, from nearly 6 to over 7 ft. long, 3-4 in. broad, gradually attenuated from the base to the apex and ending in a sub-flagelliform point, for a short space deeply canaliculate, the remainder flat, finely veined on both sides, smooth and shining towards the base. Margins in the upper portion unarmed; the lower part dentate with short, acute, remote teeth; middle nerve prominent beneath. Syncarp pedunculate, pendulous, solitary, and oblong, 6-8 in. in diameter and 8-13 in. long. Drupes numerous, in clusters of 9-13 large, about 3 in. long and 2 in. broad, oblong, broadest about the middle, irregularly longitudinally costate, lower part fibrous. Top slightly convex or somewhat flat.

Hab.: Cooktown, *Dempsey.*

**P. Dammannii,** *Warb.* Pandan. in Engl. Pflanzenr, 4, 9, 49. Drupes in clusters of about 9, almost globose, about 2 in. long and broad, longitudinally sulcate, top somewhat flat, stigma small.

Hab.: Batavia River, North Queensland. (Martelli Enumer, Pandan., Webbia, 4, page ii.)

## Order FILICES.

### ASPIDIUM, Sw.

**Aspidium (Nephrodium) tenericaule,** *Sw.* Stipes 1 to 2 ft., frond generally very ample, from 1 to over 4 ft. long, firm membranaceous, 3-4 pinnate, costæ, costules, and veins hirsute with long, soft, silky, spreading hairs, pinnæ on long petioles (especially in the more compound fronds) broad oblong, acuminate, wide apart, ultimate pinnules oblong or lanceolate, more or less decurrent at the base, acuminate or obtuse, pinnatifid with copious oblong entire segments, the margin often reflexed, veinlets simple or forked, generally bearing one small sorus to each small lobe or segment. Involucres cordate-reniform.

Hab.: Burleigh Heads, *J. E. Young.*

The fern now brought under notice is one of which there has been considerable confusion. I have now received a portion of a well-developed soriferous frond from Mr. J. E. Young; and from this I find that the two ferns named—*Polypodium pallidum,* Brack., and *Aspidium tenericaule,* Thwaites—are quite distinct. I had not seen good specimens of the latter until lately; thus in my former publications I had followed others and combined the two species.

### MENISCIUM, Schreb.

**M. triphyllum,** *Sw.* In the "Queensland Flora," p. 1992, I mentioned that I had never seen Queensland specimens of this interesting fern. In removal into new quarters into the Botanic Gardens, I found an old parcel of ferns collected at Cooktown many years ago by Mr. C. C. Harris, in which, among others, were one or two specimens of this rare plant, so I take the opportunity of recording the fact. As this is one of the few Queensland ferns not figured in any of my publications, a plate is given herewith.

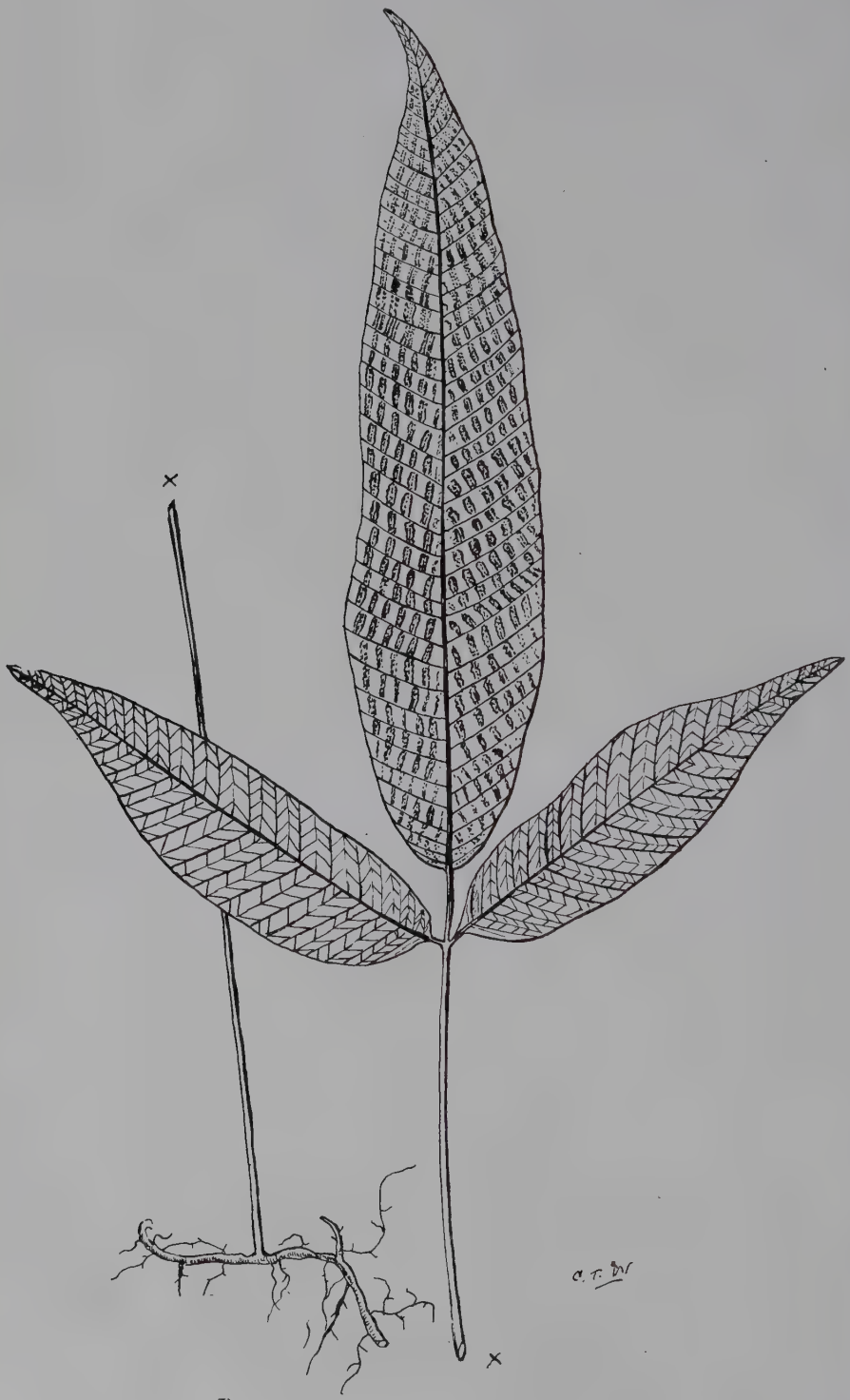


PLATE 14.—MENISCIUM TRIPHYLLUM, *Sw.*

## Order FUNGI.

The following additions to our Fungi have been determined by Miss E. M. Wakefield, Royal Botanic Gardens, Kew, England:—

**Hymenochaete attenuata,** *Lév.*

Hab.: On dead twigs, Southport, *J. H. Simmonds.*

**Morchella rotunda** (Pers), *Bond,* **var. fulva,** *Krombh.; M. esculenta* (Pers), *var. fulva, Krombh.*

Hab.: Brisbane River (near Indooroopilly), *C. T. White.* A well-known edible European fungus.

**Phyllachora stenospora,** *P. Henn.*

Hab.: On leaves of *Oplismenus compositus,* Enoggera Creek, *C. T. White.*

**Gloeosporium papayæ,** *Henn.*

Hab.: On dead and dying petioles of the Papaw (*Carica papaya*), Brisbane (*F. M. Bailey*); and on fruit, Brisbane (*C. T. White*).

**Rhinotrichum pulchrum,** *Berk.* In May, 1913, my son (J. F. Bailey) brought me a small specimen of this fungus from Dulacca. It forms orange or pink coloured powdery masses on prickly pear sprayed with arsenical compounds. In the report of the Prickly Pear Experiment Station just to hand, Dr. Jean White speaks of its common occurrence and records it as determined by the Kew authorities as the above species.

**Sporocybe,** sp., *Wakefield.*

Hab.: On dead wood, Southport, *J. H. Simmonds.*

## ALGAE.

The following addition to our Algæ have been determined by Mr. A. D. Cotton, Royal Botanic Gardens, Kew, England:—

**Sporochnus pedunculatus** (Huds.), *Ag.*

Hab.: Bribie Island, *C. T. White.*

**Nostoc commune,** *Vaucher.*

Hab.: On damp soil, Brisbane River (near Indooroopilly), *C. T. White.*

## A SOURCE OF POTASH.

In a few weeks vignerons will be pruning their vines, and we would draw their attention to the great value of the prunings as a manure. The ash is particularly rich in potash, and is consequently an excellent manure for various crops, especially potatoes, tomatoes, &c., and even for the vines themselves. In France, Germany, and Switzerland the vine cuttings are regularly used for this purpose, being sometimes chopped small and dug in round the vines. All rubbish should be collected and burnt for the sake of the potash contained in the materials.

# General Notes.

## TO REMOVE WARTS IN CATTLE.

With reference to the remedy published in the February issue of the Journal, for the removal of warts on young stock, Mr. H. L. Tait, of Yaamba, says that he has tried a remedy which he has proved to be a sure cure if applied regularly about every ten days. This consists of one-half lb. of Stockholm or coal tar mixed with about half an ounce of arsenic, applied to the warts with a brush or bundle of feathers. For blight in the eyes of cattle he has found sugar of lead to be a good cure. A first application when the trouble is noticed, followed by another three days later, and another after eight days, suffices to effect a cure.

## CALCIUM CARBIDE FOR WHITEWASH.

The carbide waste is reduced to calcium hydrate (slaked lime). It will make an excellent paint or wash for outside work—wood or iron. If 1 quart of boiled linseed oil is mixed with 10 gallons of the water used in making the paint, it will then be fairly weather-proof.

## NOTES ON THE CONSTRUCTION OF A BOWLING-GREEN.

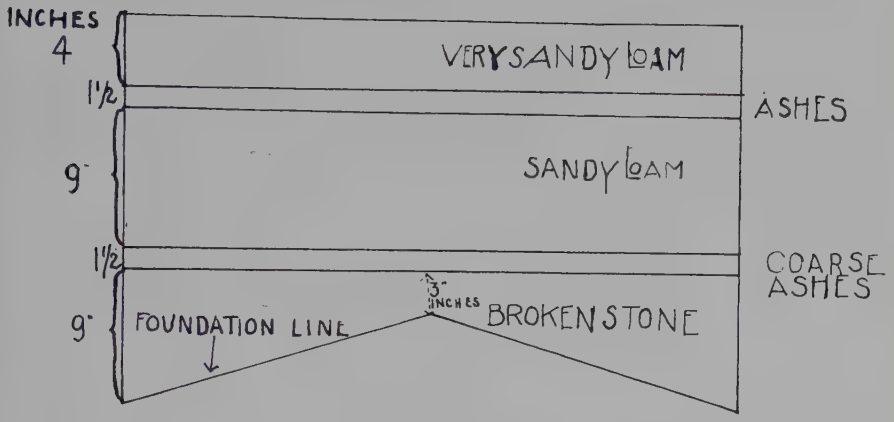
By W. SCOTT.

Considerable interest has been taken in the instructions we gave in the September issue of the Journal (1914) for laying down a bowling-green. For the further information of our correspondents we publish, in this issue, instructions by Mr. W. Scott, a well-known authority on the game of bowls and the construction of a green.

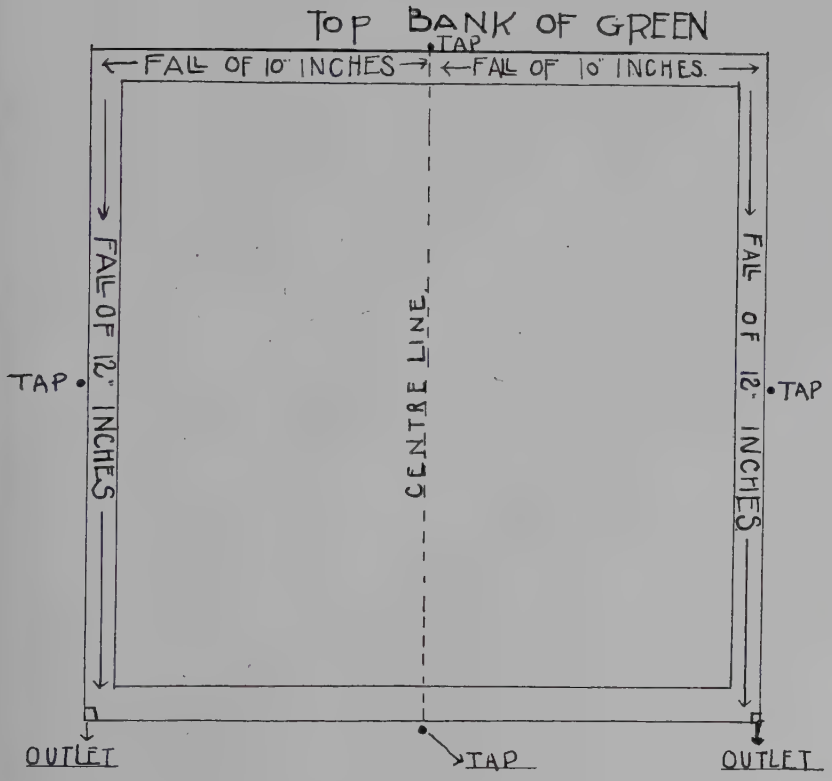
### SIZE OF THE GREEN AND DIVISION INTO RINKS, DITCHES, AND BANKS.

The playing area of the green shall be not less than 110 ft. or more than 120 ft. in length, and shall be divided into spaces called rinks, not less than 17 or more than 20 ft. in width (except that, on a ditch rink, there shall be at least 9 ft. 6 in. between the middle peg and the ditch), the centre of each rink being marked on the bank at each end and numbered consecutively, and the four corners of the rink by a perpendicular white pin, or white mark, not less than ½ in., or more than 1 in. in diameter, or width, respectively, and not less than 18 in. long, driven into the bank (not into the ditch). That the outside of the pegs or marks shall be the boundary of a rink.

# CROSS SECTION OF GREEN




# DITCHES



At the end of the green must be a ditch. All ditches must not be less than 6 in. or more than 8 in. below the level of the green, and not less than 6 in. in width, clear of all obstructions.

The end banks shall be perpendicular, and not less than 9 in. above the level of the green. Such banks shall be constructed in such a manner as not to damage a bowl striking them.

Excavate to 3 ft. 4 in. below the level of the lowest of the four banks, so that at the centre line the bed is 6 in. higher than at the ditch on either side.

Level the bed by applying a layer of broken metal (stone) 3 in. deep at the centre line, increasing to 9 in. at the sides.

Apply over all 1½ in. of coarse ashes (for drainage); over that, 9 in. of soil (sandy loam); then, another 1½ in. of coarse ashes; and, over that, 4 in. of soil (very sandy loam). On this, plant couch grass—ordinary couch; not blue. Top dress with sandy loam. Use fertiliser in the top dressing—one bag per rink, bonedust being preferable to anything else.

In constructing the ditches, there must be on the foundation a fall of 10 in. from the centre of the top bank side to the near corner on either hand, and a further fall of 12 in. from that corner down either side of the green to outlets at the other corners, all being made level by filling in with stone up to 6 or 8 in. below the level of the green.

A tap for watering to be at the middle of each of the four sides.

MEMO.—Gutter to be taken out after the foundation is formed, and the fall to be given.

## TO DESTROY YOUNG GUAVA TREES.

The root system of the guava is so strong that eradication is extremely difficult. In small patches poisoning with a strong arsenic solution, say, 1 lb. of arsenic, ½ lb. of caustic soda, dissolved in 1 gallon of water, and applied in cuts near the root of the suckers, may be tried, but it is very doubtful if the whole root system is destroyed.

# Answers to Correspondents.

## POTASH SUPPLY.

Potash may still be obtained in complete fertilisers from dealers, but it cannot be purchased by itself. In the meantime, dressing the soil with lime in form of limestone screenings will liberate potash in the soil. There is no substitute for potash in manures.

## PINEAPPLES AND MEALY BUGS.

G.E., Nambour—

The specimen of pineapple received is infested with mealy bugs. Pineapples, both fruit and plants, are subject to the attacks of those insects at the base of the leaves and surface roots. They are not likely to do any serious injury, but they give the fruit a dirty appearance. The infestation may be controlled by spraying with tobacco water.

## PLANTING SEASON FOR PINEAPPLES AND CITRUS TREES.

E.W.B., Green's Creek, Gympie—

The best season to plant pineapples is from September to March; citrus trees, February to August.

The following varieties of oranges are suitable for the district:—White Saletta, Sabina, Mediterranean Sweet, and Late Valencia; of mandarins, Scarlet Emperor, Canton, and Beauty of Glen Retreat.

## CANARY SEED.

Replying to a correspondent at Burpengary on the subject of canary seed, Mr. H. C. Quodling, Inspector of Agriculture, says:—

1. Q. Is the seed the same as used for bird feed? A. Yes.

2. Q. The quantity to sow per acre broadcast. A. Drilling is more satisfactory; 14 lb. per acre drilled; 25 lb. per acre broadcast.

3. Q. The method of cultivation (seed being small) as to harrowing, if ordinary harrow or brush harrow to be used. A. Fine seedbed essential. Lever harrows superior to brush harrows for covering seed.

4. Q. Has the Department any of the seed for sale? A. No. Try Walch and Co., Toowoomba. Correct name, *Phalaris canariensis*.

If you find it necessary to harrow in seed, it may be advisable to lightly roll the surface to induce moisture to rise, by capillary attraction, to induce seed to germinate.

## GROWING CITRUS FRUITS.

ORCHARDIST, North Isis—

In reply to your questions on the subject of citrus fruit growing, Mr. C. Ross, Instructor in Fruit Culture, says:—

"Eighteen feet is ridiculously close for the planting of citrus trees. The disadvantages of close planting are as follows:—

1st.—Not giving sufficient room for horse labour with regard to thorough cultivation.

2nd.—Pests and diseases are more likely to occur.

3rd.—Root systems intermingling with each other, larger quantities of fertilisers are required.

4th.—Susceptibility to climate changes is accentuated, and much fruit dropping is caused by drought.

5th.—Neither weight nor quality is increased.

6th.—Want of vigour and fruitfulness as trees become aged; consequently a shorter duration of existence is highly probable.

"The only advantage of close planting I know of is the probability of more fruit on a given area during the first two years of bearing.

"I recommend planting on such soil as described, and in your locality (Mount Mee) at not less than 25 ft. apart. At this, or a greater distance, a bed (a double row) of pineapples could be grown between the rows of trees for the first three years, or such crops as tomatoes, potatoes, beans, &c., allowing plenty of room for horse cultivation alongside the trees. If such crops are grown, fertilisers must be liberally supplied so that the trees are not robbed of their proper sustenance. The following is a suitable list of citrus fruits, viz.:—

*Oranges:* Sabina, Mediterranean Sweet, White Siletta, Jaffa, Joppa, Valencia Late.

*Mandarins:* Beauty of Glen Retreat, Emperor, Scarlet.

*Lemons:* Sweet Rind, Lisbon, Villa Franca, Messina.

*Limes:* Tahiti.

"Planting operations may commence at once or as soon as the summer growth is properly lignified and continued until August. Autumn, however, is the best season. I prefer worked trees, although seedlings are of stronger constitution and more robust, but the bearing habit is deferred to some years later. It would be safe to plant them as breakwinds, and they are very profitable when aged. Many old seedlings in the State give wonderful annual records. My advice is to order at once, and any of our Queensland nurserymen can supply.

"I do not, as a rule, advise planting other fruit trees in conjunction with citrus fruits for fear of breeding and prolonging the fruit-fly pest; but if desired, a restricted number of the following may be planted (isolated if possible) for home use, viz.:—Figs, persimmons, goose plums, cooking pears, and two or three apples."

## DEVIL GRASS OR GIANT COUCH.

From the description furnished it is evident that the grass in question will be eradicated only by ploughing, harrowing, and burning up all the grass that can be collected, and by keeping the plough going at right angles to the previous ploughing.

This grass is readily propagated from portions of the stem, and if left undisturbed in moist soil soon forms a dense matted growth.

Smothering crops are to be preferred to "hoed" crops, should it be possible to get the land fairly clean. Japanese millet can be sown up till the end of this month.

It would be best to sow the seed broadcast, using up to 25 lb. of seed per acre.

## ARSENIC SOLUTION FOR DESTROYING WEEDS.

Weak arsenical solutions have been used for the destruction of weeds in banana and sugar plantation for some time, and so far no injurious results to crops have been observed. There is no doubt that the continued and repeated use of such sprays will lead to an accumulation of arsenic in the soil, and we have, so far, no data to know when a dangerous amount which would injure the crop itself is reached. From past experience it appears as if the arsenic which is applied in a soluble form, as soon as it reaches the soil, is changed into an insoluble form, as indicated by the fact of the weeds growing again after a short time, but it is quite possible that, by other changes, this arsenic may become soluble again and then injure the plants. There is always some risk in using this method.

## GOAT'S MILK AND CHEESE.

C.W.M., Mackay—

1. The cream can be separated from goat's milk by the ordinary separator.

2. There is no quick and simple method of making a nourishing and palatable cheese from the milk of the goat.

In some countries the milk of the goat is utilised in limited quantities for making a variety of cheese which is consumed promptly after its manufacture, but the process cannot be successfully followed in Northern Queensland, where the climatic conditions are adverse to the conversion of milk into cheese, unless in instances where the operations are conducted in efficiently equipped premises and the manipulator of the milk possesses a sound knowledge in both the theory and practice of the work.

It is extremely doubtful whether a sufficient quantity of goat's milk is available in any part of Queensland to command either of the above essentials.

## MANURES FOR RED SOILS.

A.B., Wellington Point—

Superphosphates, or, as sometimes called, acid phosphates, are not very suitable for red soils, as they rapidly change into insoluble phosphates. For this reason Thomas's phosphate or basic slag is recommended to be used in preference, but about one-third more has to be used. If, for instance, 3 cwt. superphosphate is recommended, use 4 cwt. basic slag. Nitrogen is best applied in form of dried blood, or again in form of nitrate of lime, or of nitrolim.

Nitrate of lime and nitrolim are best applied as top dressings, whereas dried blood can be mixed with other manures immediately before being applied. In red soils, bone meal is also found to be very effective, and can be used as a change in alternate seasons instead of basic slag. These remarks apply equally to bananas, pineapples, tomatoes, and strawberries.

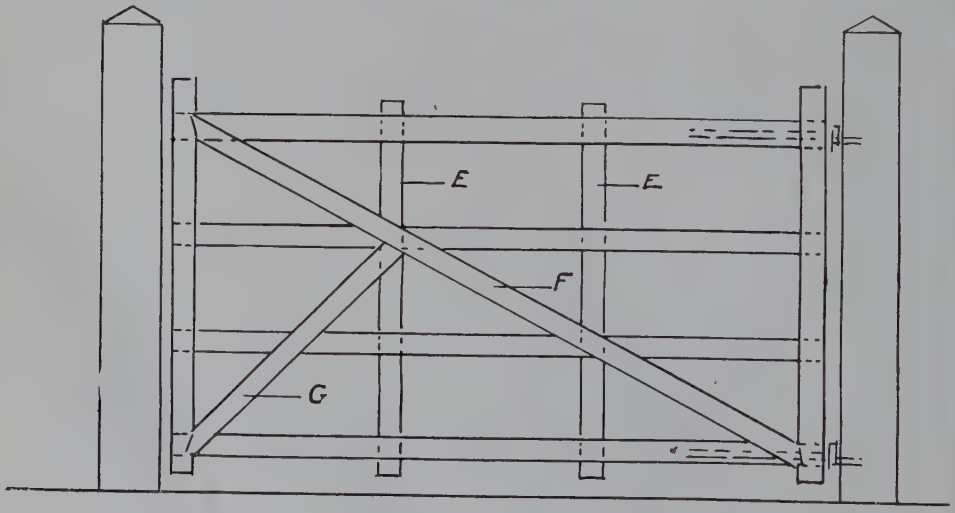
An application of limestone screenings at the rate of 1 to 2 tons per acre every three years will also be found very beneficial, particularly now when potassic manures are getting scarce.

## FARM GATE.

E. BAKER, Cairns—

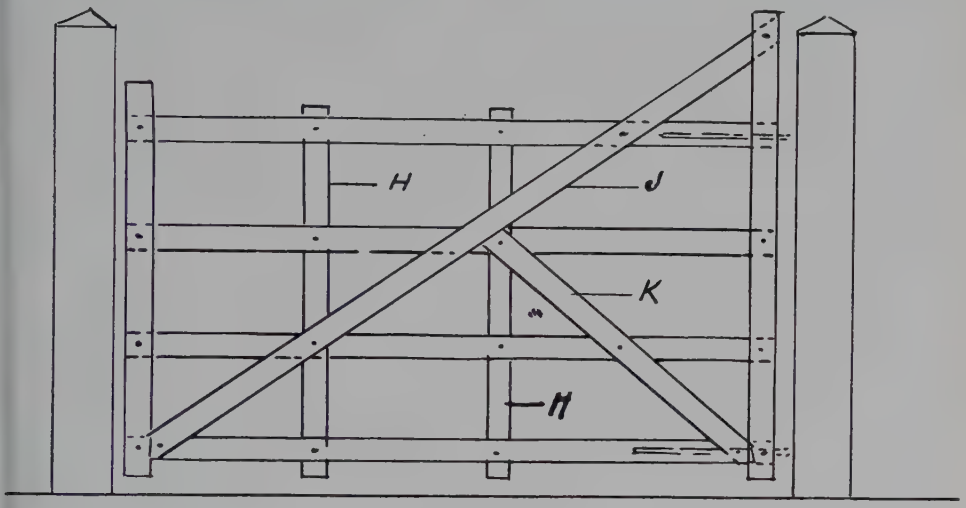
In response to your inquiry *re* gates, Mr. A. Morry, surveyor to the Department of Agriculture and Stock, furnishes the accompanying diagrams and note:—

"In order to better explain this, I have prepared the accompanying diagrams, which illustrate a type of gate very frequently used on account of the ease with which it may be constructed.




— PLAN. A. —

"The head and heel of the gate in each case are made double, 4 in. or 5 in. by 1 in., or, if for rough usage, 1¼ in. thick each; the rails are simply bolted, and in plan A the brace is in compression—that is, the weight of the gate is transmitted by the brace to the lower part of the heel or hanging stile; the brace should be checked into the head at the top and into the heel at the bottom, so as to take the weight off the bolts. This method is quite correct in theory, but is not to be recommended in practice, as the whole of the weight is carried on one side; the stiffeners EE and the short brace G will deviate this defect, and the gate will be durable in this way: It would be better still to omit EE and make F and G double, or omit EE and G and place another brace on the opposite side similar to F, but in the opposite direction; this is the strongest method, as the gate is then braced both in compression and tension. Plan




—PLAN. B.—

B shows a method frequently met with; the brace is in tension throughout—that is, the weight of the gate is suspended from the top of the heel or hanging stile. HH are intended as stiffeners to the bars, and K is a short brace which will be in compression, as a portion of the weight is transmitted by its means to the bottom of the heel. This is also correct in principle, but would be improved, as in plan A, by having a cross brace on the other side in compression and omitting HH and K.

## HEAVIEST COB OF MAIZE.

E. A. Hoffmann, Guluguba—

Competitions at shows are usually for twelve heaviest ears of maize, and we have not any record of a single cob competition by way of answering your question.

## INFLORESCENCE OF THE PAPAW TREE.

M.M., Woombye—

It is not unusual for the inflorescence or fruit to be produced in the manner you describe. You are acting wisely in thinning out the fruit. The bleeding will cause no harm to the tree.

## FEEDING CALVES.

Linseed meal, " Sunlight " oil cake, pollard, cotton seed meal, and maize meal may be added to skim milk for the purpose of feeding calves. The meals may be first prepared by mixing with boiling water until a thick paste results, and from one-half pint to one pint of the paste added to each gallon of milk intended for calf-feeding purposes.

## SHRINKAGE OF MAIZE IN STORE.

The Agricultural Department has no actual records of shrinkages. American authorities state that the loss by drying is estimated in America at 15 per cent., but it varies with different varieties. Yellow Dent will lose 21 per cent. of the original weight. According to the degree of drying before storage or shipment, the loss in weight ranges from 3 to an extreme of 30 per cent. in four and a-half months.

## INOCULATION OF STOCK.

A. R. GORDON, Tiaro—

Your letter of 27th February was referred to Mr. A. McGown, Government Veterinary Surgeon, who writes:—

" I should advise immediate inoculation of all stock.

" 1. There is no danger in mixing uninoculated stock with inoculated ones.

" 2. One cannot say that there will be no deaths, but the number should be very small if inoculation is properly carried out.

" 3. Cattle sick from inoculation should be kept under observation until the period has elapsed.

" 4. There will be no feverish symptoms set up. A rise in temperature from 101 degrees (normal) to 104 or 105 degrees.

" Some may show a swelling at the tip of the tail, while others may swell right up to the rump. These symptoms usually disappear in from ten to fourteen days. If the swelling is very severe and travelling right up the tail, it is often advisable to amputate the tail immediately above the swelling."

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR MARCH, 1915.

| Article. | | MARCH. Prices. |
|---|---|---|
| Bacon | lb. | 11½d. |
| Bran | ton | £8 10s. to £9 |
| Butter | cwt. | 120s. |
| Chaff, Mixed | ton | £5 10s. |
| Chaff, Oaten | „ | £7 to £8 |
| Chaff, Lucerne | „ | £4 15s. to £5 10s. |
| Chaff, Wheaten | „ | £4 to £4 10s. |
| Cheese | lb. | 9d. to 10d. |
| Flour | ton | £17 10s. |
| Hams | lb. | 1s. 2d. to 1s. 3d. |
| Hay, Oaten | ton | £8 10s. to £9 |
| Hay, Lucerne (Prime) | „ | £5 10s. |
| Honey | lb. | 2d. to 3d. |
| Maize | bush. | 4s. 6d. to 5s. |
| Oats | „ | 4s. 9d. |
| Onions | ton | £7 to £9 |
| Peanuts | lb. | 3d. to 3½d. |
| Potatoes | ton | £5 to £7 |
| Potatoes (Sweet) | cwt. | 3s. 6d. to 4s. 6d. |
| Pumpkins | ton | £3 10s. to £4 |
| Eggs | doz. | 10½d. to 1s. 9d. |
| Fowls | pair | 3s. 6d. to 5s. |
| Ducks, English | „ | 2s. 6d. to 3s. 3d. |
| Ducks, Muscovy | „ | 4s. to 5s. |
| Turkeys (Hens) | „ | 8s. to 9s. |
| Turkeys (Gobblers) | „ | 11s. to 15s. |
| Wheat | bushel | 7s. 6d. |

## SOUTHERN FRUIT MARKETS.

| Article. | MARCH. Prices. |
|---|---|
| Bananas (Queensland), per case | 8s. to 10s. |
| Bananas (Fiji), per case | 22s. to 22s. 6d. |
| Bananas (G.M.), per case | ... |
| Mangoes, per case | 4s. to 10s. |
| Oranges (Navel), per case | 15s. to 16s. |
| Oranges, Italian (Seville), per case | |
| Oranges (Other), per case | |
| Passion Fruit, per half-case | 2s. to 9s. |
| Papaw Apples, per half-case | 1s. 6d. to 2s. 6d. |
| Pineapples (Queens), per case | 3s. to 6s. |
| Pineapples (Ripleys), per case | 4s. to 5s. |
| Pineapples (Common), per case | 4s. to 5s. |
| Tomatoes, per quarter-case | 3s. to 5s. |
| Persimmons, per half-case | 3s. 6d. to 4s. |
| Rockmelons, per double case | 3s. to 5s. |
| Watermelons, per dozen | 4s. to 12s. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | MARCH. Prices. |
|---|---|
| Apples (American), Eating, per case | 8s. to 9s. |
| Apples (Local), per case | 3s. to 6s. |
| Apples, Cooking, per case | ... |
| Apricots, per quarter-case | 4s. to 5s. |
| Bananas (Cavendish), per dozen | 1d. to 2½d. |
| Bananas (Sugar), per dozen | 1d. to 2½d. |
| Cape Gooseberries, per quarter-case | ... |
| Cherries, per quarter-case | ... |
| Cocoanuts, per sack | 12s. to 15s. |
| Cumquats, per case | ... |
| Custard Apples, per quarter-case | ... |
| Lemons (Local), per case | 5s. to 6s. |
| Lemons (Italian), per case | 12s. |
| Limes, per case | ... |
| Mandarins, per half-case | ... |
| Mangoes, per quarter-case | 1s. 6d. to 4s. |
| Nectarines, per quarter-case | 2s. 6d. to 4s. 6d. |
| Oranges (Japanese Navel), per case | ... |
| Oranges (other), per case | ... |
| Papaw Apples, per quarter-case | 1s. 6d. to 2s. 6d. |
| Passion Fruit, per case | 2s. 6d. to 5s. |
| Peaches, per quarter-case | 2s. 6d. to 5s. 6d. |
| Peanuts, per pound | 3½d. |
| Pears, per case | 9s. to 12s. |
| Persimmons, per quarter-case | 1s. to 2s. 6d. |
| Pineapples (Ripley), per dozen | 9d. to 3s. 6d. |
| Pineapples (Rough), per dozen | 8d. to 3s. |
| Pineapples (Smooth), per dozen | 1s. to 2s. 6d. |
| Plums, per case | 3s. to 4s. |
| Rockmelons, per dozen | 7s. to 8s. |
| Rosellas, per sugar bag | ... |
| Strawberries, per tray | ... |
| Strawberries, per dozen boxes | ... |
| Tomatoes, per quarter-case | 1s. to 3s. 3d. |
| Watermelons, per dozen | 4s. to 12s. |

### VEGETABLES.

| | |
|---|---|
| Peas ... per sugar bag | 7s. to 10s. 6d. |
| Cabbages (Prime) ... per dozen | 5s. to 12s. |
| Beans (Prime) ... per sugar bag | 6s. to 9s. |
| Parsnips and Carrots ... per dozen bunches | 1s. 9d. |
| Cucumbers ... per dozen | 1s. to 1s. 6d. |
| Custard Marrows ... „ | 4d. to 9d. |
| Vegetable Marrows ... „ | 3s. to 5s. 6d. |
| Beetroot ... per dozen bunches | 1s. to 1s. 3d. |

## TOP PRICES, ENOGGERA YARDS, FEBRUARY, 1915.

| Animal. | February. Prices. |
|---|---|
| Bullocks ... ... ... ... ... ... ... ... | £13 2s. 6d. to £15 17s. 6d. |
| Cows ... ... ... ... ... ... ... ... | £10 5s. to £12 15s. |
| Merino Wethers ... ... ... ... ... ... ... | 21s. 3d. |
| Crossbred Wethers ... ... ... ... ... ... | 25s. |
| Merino Ewes ... ... ... ... ... ... ... | 16s. 3d. |
| Crossbred Ewes ... ... ... ... ... ... ... | 20s. |
| Lambs ... ... ... ... ... ... ... ... | 18s. 9d. |
| Pigs (Porkers) ... ... ... ... ... ... ... | 41s. |

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

Table showing the Average Rainfall for the Month of February in the Agricultural Districts, together with Total Rainfalls during February, 1915 and 1914, for Comparison.

| Divisions and Stations. | Average Rainfall. Feb. | Average Rainfall. No. of Years' Records. | Total Rainfall. Feb., 1915. | Total Rainfall. Feb., 1914. |
|---|---|---|---|---|
| *North Coast.* | In. | | In. | In. |
| Atherton ... ... | 10·56 | 13 | 2·94 | 7·27 |
| Cairns ... ... | 14·73 | 27 | 5·56 | 17·42 |
| Cardwell ... ... | 16·27 | 27 | 4·92 | 15·25 |
| Cooktown ... ... | 11·92 | 27 | 11·00 | 17·02 |
| Herberton ... ... | 7·59 | 27 | 2·01 | 6·68 |
| Ingham ... ... | 15·74 | 22 | 8·05 | 17·84 |
| Innisfail ... ... | 21·78 | 27 | 13·04 | 21·05 |
| Mossman ... ... | 16·47 | 5 | 4·41 | 18·23 |
| Townsville ... ... | 12·02 | 30 | 2·81 | 4·76 |
| *Central Coast.* | | | | |
| Ayr ... ... ... | 10·03 | 27 | 0·39 | 3·15 |
| Bowen ... ... | 9·15 | 27 | 2·39 | 3·91 |
| Charters Towers ... | 4·21 | 27 | 0·95 | 0·97 |
| Mackay ... ... | 12·43 | 27 | 8·99 | 4·41 |
| Proserpine ... ... | 10·95 | 11 | 9·13 | 12·66 |
| St. Lawrence ... | 8·70 | 27 | 6·68 | 4·64 |
| *South Coast.* | | | | |
| Biggenden ... ... | 3·72 | 14 | 6·10 | 4·27 |
| Bundaberg ... ... | 6·56 | 27 | 12·81 | 3·40 |
| Brisbane ... ... | 6·58 | 64 | 8·17 | 3·20 |
| Childers ... ... | 5·80 | 19 | 10·04 | 6·34 |
| Crohamhurst ... | 15·80 | 23 | 19·35 | 22·05 |
| Esk ... ... ... | 6·00 | 27 | 7·44 | 4·46 |
| Gayndah ... ... | 4·31 | 27 | 2·26 | 2·85 |
| Gympie ... ... | 6·84 | 27 | 8·26 | 6·83 |
| Glasshouse M'tains | 8·80 | 6 | 11·84 | 23·94 |
| Kilkivan ... ... | 5·62 | 27 | 3·85 | 3·85 |
| Maryborough ... | 6·72 | 27 | 7·66 | 11·95 |

| Divisions and Stations. | Average Rainfall. Feb. | Average Rainfall. No. of Years' Records. | Total Rainfall. Feb., 1915. | Total Rainfall. Feb., 1914. |
|---|---|---|---|---|
| *South Coast*—continued: | In. | | In. | In. |
| Nanango ... ... | 4·93 | 27 | 4·12 | 3·36 |
| Rockhampton ... | 8·31 | 27 | 9·03 | 2·77 |
| Woodford ... ... | 9·56 | 27 | 15·59 | 10·32 |
| Yandina ... ... | 12·66 | 21 | 13·97 | 13·37 |
| *Darling Downs.* | | | | |
| Dalby ... ... | 2·91 | 27 | 1·41 | 0·69 |
| Emu Vale ... ... | 2·28 | 17 | 0·56 | 5·54 |
| Jimbour ... ... | 3·72 | 24 | 0·37 | 0·90 |
| Miles ... ... | 2·80 | 27 | 0·70 | 1·38 |
| Stanthorpe ... | 3·19 | 27 | 0·43 | 1·80 |
| Toowoomba ... | 4·72 | 27 | 4·01 | 4·15 |
| Warwick ... ... | 3·23 | 27 | 0·14 | 0·59 |
| *Maranoa.* | | | | |
| Roma ... ... | 3·14 | 25 | 0·14 | 6·91 |
| *State Farms, &c.* | | | | |
| Gatton College ... | 3·35 | 14 | 3·98 | 2·53 |
| Gindie ... ... | 2·34 | 13 | 0·42 | 3·32 |
| Kamerunga Nurs'y | 14·84 | 23 | 5·55 | 17·95 |
| Kairi ... ... | ... | ... | 1·33 | 9·57 |
| Sugar Experiment Station, Mackay | 9·95 | 16 | 7·51 | 5·55 |
| Bungeworgorai ... | ... | ... | 0·33 | 5·92 |
| Warren ... ... | ... | ... | 4·84 | 1·50 |
| Hermitage ... | 3·08 | 7 | 0·15 | 0·71 |

Note.—The averages have been compiled from official data during the periods indicated; but the totals for February this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

# TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

| Date. | JANUARY. | | FEBRUARY. | | MARCH. | | APRIL. | |
|---|---|---|---|---|---|---|---|---|
| | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 4·57 | 6·45 | 5·22 | 6·42 | 5·41 | 6·20 | 5·58 | 5·46 |
| 2 | 4·57 | 6·45 | 5·22 | 6·42 | 5·42 | 6·19 | 5·58 | 5·45 |
| 3 | 4·58 | 6·46 | 5·23 | 6·41 | 5·43 | 6·18 | 5·59 | 5·44 |
| 4 | 4·58 | 6·46 | 5·23 | 6·41 | 5·44 | 6·17 | 5·59 | 5·43 |
| 5 | 4·59 | 6·47 | 5·24 | 6·40 | 5·45 | 6·15 | 6·0 | 5·42 |
| 6 | 4·59 | 6·47 | 5·24 | 6·40 | 5·45 | 6·14 | 6·0 | 5·41 |
| 7 | 5·0 | 6·47 | 5·25 | 6·39 | 5·45 | 6·13 | 6·1 | 5·40 |
| 8 | 5·1 | 6·47 | 5·26 | 6·38 | 5·46 | 6·12 | 6·1 | 5·39 |
| 9 | 5·2 | 6·47 | 5·27 | 6·37 | 5·46 | 6·11 | 6·2 | 5·38 |
| 10 | 5·3 | 6·47 | 5·28 | 6·36 | 5·47 | 6·10 | 6·2 | 5·37 |
| 11 | 5·3 | 6·47 | 5·29 | 6·36 | 5·47 | 6·9 | 6·3 | 5·36 |
| 12 | 5·4 | 6·47 | 5·30 | 6·35 | 5·48 | 6·8 | 6·4 | 5·34 |
| 13 | 5·5 | 6·47 | 5·30 | 6·34 | 5·48 | 6·7 | 6·4 | 5·34 |
| 14 | 5·6 | 6·47 | 5·31 | 6·34 | 5·49 | 6·6 | 6·4 | 5·33 |
| 15 | 5·7 | 6·47 | 5·32 | 6·33 | 5·49 | 6·5 | 6·5 | 5·32 |
| 16 | 5·8 | 6·47 | 5·33 | 6·32 | 5·50 | 6·4 | 6·5 | 5·31 |
| 17 | 5·9 | 6·47 | 5·34 | 6·31 | 5·50 | 6·3 | 6·6 | 5·30 |
| 18 | 5·10 | 6·47 | 5·34 | 6·30 | 5·51 | 6·2 | 6·6 | 5·29 |
| 19 | 5·11 | 6·46 | 5·35 | 6·29 | 5·52 | 6·0 | 6·7 | 5·28 |
| 20 | 5·12 | 6·46 | 5·36 | 6·28 | 5·53 | 5·59 | 6·8 | 5·27 |
| 21 | 5·12 | 6·46 | 5·36 | 6·28 | 5·53 | 5·58 | 6·8 | 5·26 |
| 22 | 5·13 | 6·45 | 5·37 | 6·27 | 5·53 | 5·57 | 6·9 | 5·25 |
| 23 | 5·14 | 6·45 | 5 37 | 6·26 | 5·54 | 5·56 | 6·9 | 5·24 |
| 24 | 5·15 | 6·45 | 5·37 | 6·25 | 5·54 | 5·55 | 6·10 | 5·23 |
| 25 | 5·16 | 6·44 | 5·38 | 6·24 | 5 54 | 5·54 | 6·10 | 5·22 |
| 26 | 5·16 | 6·44 | 5·38 | 6·23 | 5·55 | 5·53 | 6·11 | 5·21 |
| 27 | 5·17 | 6·44 | 5·39 | 6·22 | 5·55 | 5 52 | 6·11 | 5·20 |
| 28 | 5·18 | 6·44 | 5·40 | 6·21 | 5·56 | 5·51 | 6·12 | 5·20 |
| 29 | 5·19 | 6·43 | ... | ... | 5·56 | 5·50 | 6·12 | 5·19 |
| 30 | 5 20 | 6·43 | ... | ... | 5·57 | 5·49 | 6·13 | 5·18 |
| 31 | 5·21 | 6·43 | ... | ... | 5·58 | 5·48 | ... | ... |

## PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 1 Jan. | ○ | Full Moon | 10 | 20 | p.m. |
| 9 „ | ☽ | Last Quarter | 7 | 12 | a.m. |
| 16 „ | ● | New Moon | 12 | 41 | „ |
| 23 „ | ☾ | First Quarter | 3 | 32 | p.m. |
| 31 „ | ○ | Full Moon | 2 | 41 | „ |

The moon will be brightest, under favourable atmospheric conditions, when in the last quarter, as it will then be nearer to the earth.

| | | | | | |
|---|---|---|---|---|---|
| 7 Feb. | ☽ | Last Quarter | 3 | 11 | p.m. |
| 14 „ | ● | New Moon | 2 | 31 | „ |
| 22 „ | ☾ | First Quarter | 12 | 58 | „ |

There will be no actual Full Phase this month, two having occurred in January. The moon will be nearest to earth on 7th February at 11·18 p.m.

| | | | | | |
|---|---|---|---|---|---|
| 2 Mar. | ○ | Full Moon | 4 | 32 | a.m. |
| 8 „ | ☽ | Last Quarter | 10 | 27 | p.m. |
| 16 „ | ● | New Moon | 5 | 42 | a.m. |
| 24 „ | ☾ | First Quarter | 8 | 48 | „ |
| 31 „ | ○ | Full Moon | 3 | 38 | p.m. |

The moon will be nearest the earth on the 5th at 1 p.m., and farthest from the earth on the 21st at 11·12 a.m. The moon's distance from the earth at these times will be about 225,000 miles, and about 252,000 miles, respectively.

| | | | | | |
|---|---|---|---|---|---|
| 7 Apr. | ☽ | Last Quarter | 6 | 12 | a.m. |
| 14 „ | ● | New Moon | 9 | 36 | p.m. |
| 23 „ | ☾ | First Quarter | 1 | 39 | a.m. |
| 30 „ | ○ | Full Moon | 12 | 19 | „ |

The moon will be in perigee, or nearest to the earth, on the 2nd at 9·36 a.m., and on the 30th at 5·12 p.m. It will be in apogee, or farthest from the earth, on the 18th at 1·36 a.m.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

# Farm and Garden Notes for May.

Field.—During this month the principal work in the field will be the sowing of wheat, barley, oats, rye, and vetches. There is no time to lose now in this work. Potatoes should be hilled up. Cut tobacco. The last of the cotton crop should now be picked, the bushes being stripped daily after the dew has evaporated. Growers are notified that Messrs. Kitchen and Sons, in the Valley, Brisbane, and Messrs. Joyce Brothers, of Ipswich, are buyers of seed cotton, so that a sure means of disposing of the crop is available. Every effort should be made to ensure feed for stock during the winter, by utilising all kinds of green fodder, in the form of ensilage or hay. Those who own dairy stock will be wise to lay down permanent grasses suitable to the climate and to their particular district and soil. A few acres of artificial grass will support a surprisingly large number of cattle or sheep in proportion to acreage. Couch grass in the West, as has been proved at Barcaldine, will carry 10 or 12 sheep to the acre. Coffee-picking should now be in full swing, and the berries pulped as they are picked. Strawberries may be transplanted. The best varieties are Pink's Prolific, Aurie, Marguerite, Hautbois, and Trollope's Victoria. The Aurie is the earliest, and the Marguerite next. In some localities strawberry planting is finished in March, and the plants bear their first fruits in August. In others, fruit may be gathered in July, and the picking does not end until January.

Kitchen Garden.—Onions which have been planted in seed beds may now be transplanted. The ground should have been thoroughly cleaned, pulverised, and rolled previous to transplanting. Onions may still be sown in the open on clean ground. In favourable weather plant out cabbages, cauliflowers, lettuce, leeks, beetroot, endive, &c. Sowings may also be made of all these, as well as of peas, broad beans, kohl-rabi, radishes, spinach, turnips, parsnips, and carrots. Dig and prepare beds for asparagus.

Flower Garden.—Transplanting and planting may be carried out simultaneously during this month in showery weather; the plants will thus be fully established before the early frosts set in. Camellias and gardenias may be safely transplanted, also such soft-wooded plants as verbenas, petunias, penstemons, &c. Cut back and prune all trees and shrubs ready for digging. Dahlia roots should be taken up and placed in a shady situation out of doors. Plant bulbs, such as anemones, ranunculus, snowflakes, freesias, ixias, iris, narcissus, &c. Tulips and hyacinths may be tried, but success in this climate is very doubtful. All shades and screens may now be removed to enable the plants to get the full benefit of the air. Fork in the mulching, and keep the walks free from weeds. Clip edges and edgings.

# Orchard Notes for May.

## THE SOUTHERN COAST DISTRICTS.

The advice given respecting the handling and marketing of citrus fruits in the last two numbers of this Journal applies with equal force to this and the following months. Do not think that you can give the fruit too much care and attention; it is not possible, as the better they are handled, graded, and packed the better they will carry, and the better the price they will realise.

Continue to pay careful attention to specking, and fight the blue mould fungus everywhere. Don't let mouldy fruit lie about on the ground, hang on the trees, or be left in the packing-shed, but destroy it by burning. Keep a careful lookout for fruit fly, and sweat the fruit carefully before packing. If this is done, there will be little fear of the fruit going bad in transit or being condemned on its arrival at Southern markets. Where the orchard has not been already cleaned up, do so now, and get it in good order for winter. Surface working is all that is required, just sufficient to keep moisture in the soil; keep down undergrowth, and prevent the packing of the surface soil by trampling it down when gathering the fruit.

Keeping the orchard clean in this manner enables any fallen fruit to be easily seen and gathered, and it need hardly be stated, what has been mentioned many times before, that diseased fruit should on no account be allowed to lie about and rot on the ground, as this is one of the most frequent causes of the spreading of many fruit pests.

May is a good month to plant citrus trees, as if the ground is in good order they get established before the winter, and are ready to make a vigorous growth in spring.

Don't plant the trees, however, till the land is ready, as nothing is gained thereby, but very frequently the trees are seriously injured, as they only make a poor start, become stunted in their growth, and are soon overtaken by trees planted later, that are set out under more favourable conditions. The land must be thoroughly sweet, and in a good state of tilth—that is to say, deeply worked, and worked down fine. If this has been done, it will probably be moist enough for planting; but should there have been a dry spell, then when the hole has been dug and

the tree set therein, and the roots just covered with fine top soil, 4 to 8 gallons of water should be given to each tree, allowed to soak in, and then covered with dry soil to fill up the hole. In sound, free sandy loams that are naturally scrub, holes may be dug and the trees planted before the whole of the ground is brought into a state of perfect tilth. It is, however, better to do the work prior to planting, as it can then be done in the most thorough manner; but if this is not found possible, then the sooner it is done after planting the better. If the land has been thoroughly prepared, there is no necessity to dig big holes, and in no case should the holes be dug deeper than the surrounding ground either is or is to be worked. The hole need only be big enough to allow the roots to be well spread out, and deep enough to set the tree at the same depth at which it stood when in the nursery. Plant worked trees 24 to 25 ft. apart each way, and seedlings at least 30 ft. apart each way.

Towards the end of the month cover pineapples when there is any danger of frost; dry blady grass or bush hay is the best covering. Keep the pines clean and well worked—first, to retain moisture; and, secondly, to prevent injury from frost—as a patch of weedy pines will get badly frosted when a clean patch alongside will escape without any serious injury.

Slowly acting manures—such as meatworks manure when coarse, boiling-down refuse, farm manure, or composts—may be applied during the month, as they will become slowly available for the trees' use when the spring growth takes place; but quickly-acting manures should not be applied now.

## THE TROPICAL COAST DISTRICTS.

May is a somewhat slack month for fruit—pines, papaws, and granadillas are not in full fruit, the autumn crop of citrus fruit is over, and the spring crop only half-grown. Watch the young citrus fruit for Maori, and when it makes its appearance spray with the sulphide of soda wash. Keep the orchard clean, as from now till the early summer there will not be much rain, and if the orchard is allowed to run wild—viz., unworked and dirty—it is very apt to dry out, and both the trees and fruit will suffer in consequence.

Bananas should be kept well worked for this reason, and, though the fly should be slackening off, every care must still be taken to prevent any infested fruit being sent to the Southern markets.

Citrus fruits can be planted during the month, the remarks *re* this under the heading of the "Southern Coast Districts" being equally applicable here.

## THE SOUTHERN AND CENTRAL TABLELANDS.

Get land ready for the planting of new deciduous orchards, as, although there is no necessity to plant so early, it is always well to have the land in order, so as to be ready to plant at any time that the weather is suitable. The pruning of deciduous trees can commence towards the end of the month in the Stanthorpe district, and be continued during June and July. It is too early for pruning elsewhere, and too early for grapes, as a general rule. Keep the orchard clean, particularly in the drier parts. In the Stanthorpe district grow a crop of blue or grey field peas or a crop of vetches between the trees in the older orchards as a green manure. The crop to be grown as a green manure should have the soil well prepared before planting, and should be manured with not less than 4 cwt. of phosphatic manure, such as Thomas phosphate or fine bone dust, per acre; the crop to be ploughed in when in the flowering stage. The granitic soils are naturally deficient in organic matter and nitrogen as well as phosphoric acid, and this ploughing in of a green crop that has been manured with a phosphatic manure will have a marked effect on the soil.

Lemons will be ready for gathering in the Roma, Barcaldine, and other districts. They should be cut from the trees, sweated, and cured down, when they will keep for months and be equal in quality to the imported Italian or Californian fruit. If allowed to remain on the trees, the fruit becomes over-large and coarse, and is only of value for peel. Only the finest fruit should be cured; the larger fruit, where the skin is thicker, is even better for peel, especially if the skin is bright and free from blemish; scaly fruit—scabby, warty, or otherwise unsightly fruit—is not suitable for peel, and trees producing such require cleaning or working over with a better variety, possibly both.

The remarks *re* other citrus fruit and the work of the orchard generally, made when dealing with the Coast Districts, apply equally well here, especially as regards handling the crop and keeping down pests.

QUEENSLAND AGRICULTURAL JOURNAL

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# Agriculture.

## STATE AID TO AGRICULTURE IN GERMANY AND IN QUEENSLAND.

A few years ago a consular report was issued by the British Foreign Office showing the causes which have enabled German agriculture to fight against depression so much more successfully than British rural industry. Some of those burdens which press so heavily on the latter are, or rather, were, previous to the present disastrous war, unknown in Germany, while at the same time her farmers enjoyed the benefit of protection, which, however mischievous in its general effects, undoubtedly answers its purpose in the case of those for whom it is primarily intended. The British consul at Düsseldorf on the Rhine agreed with the German authority who drew up the report in attributing the most salutary effects to fair freights and moderate protection. Other causes also have contributed very largely to the same result, but that is not saying that these alone, without the other two, would have enabled the German farmer to prosper as he did.

In Germany State aid has been carried out on a scale wholly unknown in Great Britain and her dependencies. The State founded Agricultural Colleges at many of the old Universities, and where there are no colleges there is a Chair of Agriculture, with professors to lecture on the subject. Thus an amount of scientific knowledge has been disseminated among the German farmers which has qualified them to cope with the dishonesty of many dealers in cake, meal, seed, and mineral manures in that country: has taught them how to feed their stock so as to produce either meat,

milk, or muscle; and what quantities of nitrogen, phosphates, and potash a crop needs and which must be replaced. In Germany it is assumed that the British farmer is deficient in this kind of knowledge. If so, it is much to be deplored, since he can buy all mineral manures, cakes, and meal more cheaply than his Continental rivals. While plenty of scientific agricultural knowledge exists in Britain and in her oversea dominions, it does not appear to be generally diffused, but sticks fast somewhere amongst the wealthier and more highly educated farmers.

It is not, however, only the Agricultural Colleges at the Universities to which our attention is directed. By means of schools established all over Germany, and maintained or subsidised by the State, agricultural science is brought home to the peasant farmer, and there are special schools for the training of farmers' sons. There are dairy and farriery schools. One of the greatest of German institutions is the State Experimental Station, of which there are several, established for the purpose of making experiments of all kinds, and for testing fodder, manure, seeds, &c., for farmers, at quite a nominal fee. There are also some private establishments of the same kind, but the greater part are subsidised by the State.

Even local Chambers of Agriculture receive State assistance, and travelling lecturers are supported by the Government. Then, as to co-operation. Even more importance is attributed to the principle of co-operation than to State education. Co-operation is the German farmer's stronghold and bulwark, and he means to stand by it. It is of various kinds. There are co-operative credit banks, co-operative dairies, co-operative steam ploughs, and co-operative drainage and irrigation. This co-operative operation has proved to be the key to success in Germany, and has saved many thousand farmers from ruin. The banks conducted on this principle enable farmers to obtain loans on personal security only, the collective guarantee of all the members or depositors being considered sufficient. Wealthy banking firms and rich capitalists were all willing enough to lend money on real estate if sufficient security was forthcoming, but personal credit is what German farmers wanted. It is indispensable to buy stock, mineral manures, cake, meal, seed, tools, machinery, and to pay wages—in short, to run the business. All the union requires is the co-operative guarantee of the members of the co-operative society, a body of men of recognised standing. As all the members are personally acquainted with each other, the risk is next to nothing. That the system is a sound one seems to be proved by the results of the audit. So far back as 1897, the auditors reported that of 649 banks in Würtemberg, 450 were thoroughly satisfactory, 192 were satisfactory with room for improvement, and only seven were unsound. In Germany, the Government, by having the management of the railways in their hands, are able to arrange an equitable system of freightage, while, thanks to the co-operative principle, the farmer can avail himself of the lowest freights on all the materials he requires, and on all products sent to market, by loading in quantities of at least one ton. Under this system preferential rates in Germany are an immense advantage to the farmer, whereas in England they are dead against him,

the advantages there being reaped by his foreign competitor. How much longer, in view of the present war, this ancient industry will retain its position in Germany seems very uncertain. It is already beginning to yield to time and fate and the competition of the New World. A large proportion of the land is in the hands of peasant proprietors. Some of it is let, as in England, and a considerable extent, the property of the nobility, is farmed by the owners. The proprietor cultivates his estate with the labour of the peasantry, who are practically *ascripti glebæ*, receiving only a small modicum of wages in cash, and the rest in kind, being boarded and lodged at the landlord's expense. It would seem that if the proprietors in Great Britain chose to do the same thing, and to work as hard as the Germans, they might not only improve their financial position, but regain much of their former influence. In Germany, though the fall in rents during the past few years would indicate a decline in the returns from agriculture, this class of proprietors make their own rents and appear to thrive. They (we write as matters stood before the war) live the life of an English country gentleman. But the exodus of the farm labourers commenced in Germany many years ago. German vessels, so far back as 1860, brought hundreds of German labourers to Queensland, whose descendants to-day are prosperous colonists, the more profitable industries in America and Australia drawing them from their native fields. Hence, the supply of farm labour in Germany has been yearly growing more scanty. Men are imported from Russia and Poland, and the increase in the number of women and old men employed in field labour shows that the pick of the peasantry have been turning their thoughts elsewhere. And how greatly this want of farm labour is now felt, when the said pick of the labourers are driven into the battlefields of France, Belgium, and Austria! To induce men to remain in the country, land owners and even small farmers were only too ready to let small holdings at a moderate rent, but this inducement could not tempt them, when the British colonies, especially Queensland, held out to them the prospect of becoming owners of their own freehold on the richest lands of the State, by means of land orders granted to all immigrants. This prospect brought many hundreds of Germans to the State, who, as a rule, became well-to-do farmers.

Now, coming to live stock; sheep farming in most parts of Germany has declined, and cattle are kept chiefly with a view to milk and draught purposes.

In Westphalia, Mecklenberg, and Saxony, the sugar beet reigns supreme, but here again the dearth of skilled labour, which it requires, constitutes a serious difficulty, owing to the higher wages to be obtained in towns. Agricultural wages vary, of course, in different districts. The ordinary labourer earns 1s. 9d. a day in summer, 2s. a day at harvest time, and 1s. 6d. a day during the rest of the year, but he gets a cottage free, a small plot of ground for potatoes, vegetables, and flax, and is allowed the use of farm horses to work his allotment. Piece work, especially in Saxony, is paid much higher. Beer being one of the staple products of Bavaria, much attention is, of course, paid to the barley crop. It may be mentioned that Bavarian beer may only be brewed from malt

and hops, and this regulation is enforced by very heavy penalties. With regard to German agricultural implements, these are as good as in any countries advanced in agriculture, with the exception of mowing machines and binders, in which the United States are first, and of steam ploughs and threshing machines, in which England excels. It seems, on the whole, that if our farmers had the scientific knowledge of the German ones, they would be able to hold up against taxes, railway rates, open ports, and foreign competition. It is an incontestable fact that the chemical laboratories of the Agricultural Colleges have revolutionised agriculture. Nowadays, thanks to the Agricultural Chemist, we know the chemistry of the soil, the plants, the live stock, the manures, the foods. Thus, agriculture to-day is as much a science as in old times it was a matter of purely practical experience.

So we come to this, that the best foundation a State can give to its people is a thorough genuine and technical education, to fit them out adequately in order to be able to successfully fight their way. It affords them the best chances of being able to work against long odds, so that they may hold their own in bad times, and even through such a crisis as severe droughts such as that which terminated in 1902 in Queensland, and which is even now threatening this State with disaster. The German farmer has had to fight against agricultural depression, but, by means of his thorough education and resources, backed up by science and State help, he has withstood bad seasons and low prices; he has been going ahead all the time, learning how to increase his crops and increase his income per acre in the same proportion as prices receded. With this object in view, no stone was left unturned, and his resources were strained to the utmost. He found great help in co-operation—co-operation in credit, loans, purchase and sale of produce, purchase of foods, seeds, mineral manures, in drainage and irrigation works of large dimensions, and in dairying. In all his struggles, the State helped him by encouraging scientific research at its experiment stations, by gratis advice, and farmers recognised the value of unions and combined efforts to swim up-stream. He recognised that, single-handed, he was powerless to achieve anything, but, although not individually intrinsically wealthier when combined, he found himself, when united, and working hand in hand co-operatively, strong enough and able to withstand the worst of times.

In this State of Queensland, State aid has a bad name, and though all classes are ready enough to take it when they can get it, most of them denounce it when offered to any but themselves. The prejudice, however, has its good side, and if the land were treated fairly in other respects, we doubt if our Queensland farmers would either require or desire such fostering care as is bestowed on their calling elsewhere. If a great industry like agriculture cannot rest upon its own bottom, there must be something wrong in the conditions under which it is pursued. Nor are we at all satisfied that a case has been made out for German agriculture which political economy could approve. Still, it must be recognised that State aid in Queensland in certain directions has done very much of late years to assist the farmer, not only in improved

methods of agriculture, but in the establishment of an up-to-date Agricultural College, in the institution of an Agricultural Bank, in the introduction of instruction in agriculture in State schools, in the appointment of instructors in all branches of agriculture, including sugar experiment stations, stock-breeding, wheat-growing, in the establishment of State Farms, institutions for instruction in tropical agriculture, in dairying, stock-raising. Furthermore, every encouragement is given to farmers throughout the State to improve their methods of raising and marketing their products, by means of travelling exhibits, accompanied by competent instructors. The dairying industry is especially encouraged, and has usually been under the supervision of highly-qualified scientific experts. Tropical industries have also for many years enjoyed the fostering care of the Department of Agriculture, whilst horse-breeding is assisted by a constant inspection of stallions by Government veterinary surgeons, and chemical analysis of soils, water, fodders, &c., is at the service of farmers throughout the whole State. It might be said, indeed, that the system of Government assistance to the rural industries of Queensland in many respects is quite as up-to-date as that of any European country, although, owing to the sparse population of the State, there has been as yet no necessity for the vast expenditure incurred in the United States of America, and in some European countries, in the interests of the man on the land.

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## KILLING TIMBER BY RINGBARKING AND POISONING, AS PRACTISED IN NEW SOUTH WALES.

Mr. A. H. Farrand, Diddillibah, writes:—When ringbarking was in its comparative infancy in New South Wales, thirty to forty years ago, mostly only box timber was ringed, where it had become too dense to allow pasture to grow. Areas were large and rentals very cheap, so that reclaiming inferior country was unnecessary. The style of ringbarking was sapping, but after a time other methods were tried, such as chip ringing, frill ringing, removing strip of bark around tree, &c., but chip ringing remained in general use. It was thought that sapping, causing the tree to die quickly, conduced to a plentiful and vigorous growth of suckers, and there were no doubt good grounds for such opinion. By destroying the timber quickly one is able to bring the land into use so much more quickly that such very much more than compensates for the extra suckers that it may bring. Ringing being done in the summer, when sap is well up, its effect, when tree has been sapped, is shown in a few days by leaves turning colour; and slumming of work can easily be detected, but contractors for this style might not now be easily obtained.

For some years past in New South Wales there has been a great rush for land, and any small area now made available, within reach of a railway, that can be improved into farming land, commands numerous applicants. Such blocks in almost every case are heavily timbered, and the best and cheapest method of destroying such has become an important matter.

Various liquids for poisoning trees have been put on the market, and poisoning with arsenic has been extensively practised of late years. Arsenical poisoning, like sapping, produces a very quick effect, and when it was first tried in New South Wales the Press was deluged with letters extolling its merits. The experimenter was so elated with its apparent success that he made his deductions without waiting sufficiently long to be fully seized of all the points. Arsenic is applied in a liquid form by pouring it into ring cut around tree from a vessel such as a teapot, and frill-ringing, holding such liquid best, is generally adopted. The poison is at once carried up by rising sap and the top of the tree dies as in sapping, but as such poison does not go below the ringed cut, the bottom of the tree is not affected, and a good healthy crop of suckers soon arrives.

Arsenical poisoning of trees is about on a parallel with sapping. If four cuts are put in tree opposite one another and arsenic applied tree will die, and if just one cut is put the limbs on tree on that side die, whilst the rest of the tree flourishes, thus showing how arsenic is carried up. The other liquids put on the market had much the same effect as arsenic, and as none of them had any effect below cut into which they were poured, the bottom part of tree still went on producing suckers. After a very considerable experience in dealing with timber in New South Wales in various parts, and many years with the Government, where one of my duties was to inspect ringbarked areas, so that I saw the work being done and years afterwards saw the effect, I would summarise as follows:—Have work done, whether arsenic is used or not, late in the summer, so that the suckers will begin to sprout in the winter time, when the tree is in its most unhealthy period, as you will then have fewer suckers, and those that do grow will not be such strong growers. Also, if the country is stocked with sheep, they will, in the winter time, keep nibbling at green shoots and so impede their growth, and, in some instances, altogether kill them.

Poisoning with arsenic repays the trouble, but do not make your solution too weak, as the arsenic itself is cheap. The "rise and fall of sap," so generally spoken of, is apt to deceive you, but remember, when the arsenic is applied, the sap is rising, and poison therefore carried upwards, so be prepared to see the tree below the cut still growing. This applies to every poison I have seen used.

Fire sapping is being extensively used in the farming districts of New South Wales. A little earth is removed at the foot of the tree and it is lightly ringed at the bottom, and any small timber stacked around it and burned. This causes the tree to die quickly, and it will burn up when grubbed.

## A RIVAL OF LUCERNE.

Mr. R. S. Nevill, formerly Tobacco Expert to the Department of Agriculture and Stock in Queensland, sends us the following notice, published in the "Kansas City Star" (U.S.A.), on sweet clover, as a substitute for lucerne for stock and as a soil improver. Mr. Nevill was for many years in Queensland, where he made many friends, who will be glad to hear that he is in the best of health, and comfortably settled at Carthage, Missouri:—

Sweet clover excels alfalfa as a cattle pasture and is superior to all other crops for improving soils deficient in organic matter, though it has been lately overrated as a crop to grow under all circumstances. These conclusions are reached as a result of investigations by the agronomy department of the Kansas State Agricultural College.

"In the last two years," says C. C. Cunningham, assistant in co-operative experiments, "there has taken place in the popular mind a radical change in opinion regarding sweet clover. Once considered a noxious weed, it is now recognised as a valuable crop. To a large extent sweet clover is deserving of this change of opinion regarding it, but, like any new crop that suddenly comes into favour, it has been overrated for growing under all conditions in Kansas. It has proved valuable, however, under certain conditions and for special purposes.

### A SUBSTITUTE FOR ALFALFA.

"Sweet clover can be grown to advantage for hay in Eastern Kansas on some soils not adapted to alfalfa or red clover. It is, however, a substitute for these crops and is useful for hay when the more valuable kinds cannot successfully be grown.

"Sweet clover is of value as a pasture and soil improvement crop and will undoubtedly be extensively utilised for these purposes. Properly handled, sweet clover will furnish more pasture than most other pasture crops, especially on the poorer types of soils. It excels alfalfa as a pasture for cattle, in that it rarely causes bloat. Sweet clover is superior to all other crops for use in improving soils deficient in organic matter.

### NOT FOR DRY LAND.

"During the last two years the agronomy department has co-operated with many farmers in Western Kansas in testing sweet clover on the uplands. The results obtained were not very successful. Evidently sweet clover has been overrated as a dry land crop. Under dry land conditions—that is, where alfalfa cannot be successfully grown on the uplands because of the limited amount of precipitation—sweet clover is subject to the same disadvantages. The same difficulties in obtaining a stand are met with, although sweet clover is more hardy and the chances

of failure are slightly less. Attempts to seed sweet clover under dry land conditions during the last two seasons have nearly all resulted in failure due to various causes.

DEFEATED BY THISTLES.

"In many tests the sweet clover seeded early in the spring failed to compete successfully with the ever present Russian thistle. In other tests the young plants perished in temporary periods of drought that prevailed before the sweet clover obtained a good roothold. Other stands were destroyed by beating rains before the plants made much growth. Grasshoppers relish young sweet clover plants and may, if they are numerous, destroy the crop. Where stands of sweet clover were obtained on uplands it failed to make profitable yields of hay the first season.

"Because of the high cost of the seed, the short life of the crop, the uncertainty of getting a stand, and the smaller yields of forage as compared with the sorghums, it is doubtful if sweet clover will prove a satisfactory crop on the uplands in Western Kansas."

[We do not think that Queensland farmers would care to utilise their best lucerne lands for the planting of sweet clover, which has long been looked upon as a weed, and which appears to have proved a failure for the reasons given in the above article.—Ed. Q.A.J.]

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## PRICES OF WHEAT AND THE EQUIVALENT PRICES OF MANUFACTURED PRODUCTS.

By the courtesy of the Government Statistician, Sydney, the Queensland Department of Agriculture and Stock has received the results of an investigation by Mr. J. B. Trivett, Government Statistician, New South Wales, into the cost of producing flour in Sydney, and also a copy on "The Prices of Wheat, and the Equivalent Prices of Manufactured Products" therefrom.

In view of considerable complexity surrounding this question, and the many confusing statements given by witnesses during the investigation of the price of flour, and of bran and pollard, by the Necessary Commodities Control Commission, Mr. Trivett deemed it necessary to make an examination into the whole matter of milling charges attaching to the production and distribution of flour and wheat products. For obvious reasons, details of the mills cannot be given, but the salient features of the figures supplied by millers respecting the manufacture and sale of flour in Sydney are given.

The returns now under discussion related to 5,296,457 bushels of wheat, which were bought and delivered at mills for £977,218, or at an

average price of 3s. 8·3d. per bushel, and from which 111,978 tons of flour were produced.

The following table gives the massed cost arising from the various operations during milling, and business charges attaching to the selling of the products of five city mills:—

| | Total Cost. | Cost per Ton of Flour Produced. |
|---|---|---|
| | £ | £ s. d. |
| Gristing— | | |
| Mill wages, bags, repairs, maintenance, fuel, and other materials .. .. .. | 67,998 | 0 12 1·73 |
| Other Charges of Production— | | |
| Rent, stacking, rates, fire and accident assurance, interest, depreciation.. .. | 34,161 | 0 6 1·22 |
| Selling Charges— | | |
| Discount and exchange, stamps, stationery, advertising, commission, law, salaries, travelling, bad debts, and other.. .. | 42,404 | 0 7 6·89 |
| Total cost of milling and selling .. | 144,563 | 1 5 9·84 |

I have endeavoured to find out what proportion can be fairly allowed for waste in the gross bushels purchased by the miller, and to do this have accepted, under their own definition, the figures for cleaned and uncleaned wheat, which give me the following statement :—

*Uncleaned Wheat.*—39,312 tons of flour were obtained from 1,893,865 bushels of wheat, or an average of 48·175 bushels of wheat per ton of flour produced.

*Cleaned Wheat.*—72,666 tons of flour were obtained from 3,402,592 bushels of wheat, or an average of 46·825 bushels of wheat per ton of flour produced.

Hence we get the following consideration :—

| | | |
|---|---|---|
| Uncleaned wheat .. .. .. | 48,175 | bushels per ton |
| Cleaned „ .. .. .. | 46,825 | „ „ |
| Waste .. .. .. .. | 1,350 | bushels per ton |

This waste is equivalent to 2·8 per cent.

Using the above figures, and assuming the average weight for uncleaned wheat at 60 lb. per bushel, we have the following results :—

| | | lb. |
|---|---|---|
| 48,175 bushels, at 60 lb. per bushel .. | = | 2,890·5 |
| Waste at 2·8 per cent. .. .. .. | = | 80·9 |
| Net weight of products .. .. .. | = | 2,809·6 |
| Of which flour is .. .. .. .. .. | | 2,000 |
| Offal (bran and pollard), &c. .. .. | = | 809·6 |

Whence I assume that with every ton of flour produced there is available as offal 810 lb., and the rest, viz., 81 lb., must be written off as waste which may or may not provide some small monetary advantage.

Having thus cleared the groundwork, I have calculated tables which should prove useful, showing the prices per ton at which flour can be manufactured, assuming stated prices of wheat per bushel, and of offal (bran and pollard) per ton. This gives the actual cost of the flour without any allowance for delivery charges and profit. The tables are attached.

PRICE AT MILL, SYDNEY, AT WHICH FLOUR CAN BE MANUFACTURED WITH WHEAT AND OFFAL AT STATED PRICES.

This does not allow for Profit, but is the actual Cost.

Assumed 48.175 Bushels of Wheat = 1 ton (2,000 lb.) of Flour and 810 lb. (effective) Offal.

| Price of Wheat per Bushel. | Offal at £4 10s. per Ton. | Offal at £5 per Ton. | Offal at £5 10s. per Ton. | Offal at £6 per Ton. | Offal at £6 10s. per Ton. | Offal at £7 per Ton. | Offal at £7 10s. per Ton. | Offal at £8 per Ton. | Offal at £8 10s. per Ton. |
|---|---|---|---|---|---|---|---|---|---|
| s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. | £ s. d. |
| 3 6 | 7 18 0 | 7 13 11 | 7 9 10 | 7 5 10 | 7 1 9 | .. | .. | .. | .. |
| 3 7 | 8 2 1 | 7 18 0 | 7 13 11 | 7 9 11 | 7 5 10 | 7 1 10 | .. | .. | .. |
| 3 8 | 8 6 1 | 8 2 0 | 7 17 11 | 7 13 11 | 7 9 10 | 7 5 10 | .. | .. | .. |
| 3 9 | 8 10 1 | 8 6 0 | 8 1 11 | 7 17 11 | 7 13 10 | 7 9 10 | .. | .. | .. |
| 3 10 | 8 14 1 | 8 10 0 | 8 5 11 | 8 1 11 | 7 17 10 | 7 13 10 | .. | .. | .. |
| 3 11 | 8 18 1 | 8 14 0 | 8 9 11 | 8 5 11 | 8 1 10 | 7 17 10 | 7 13 9 | .. | .. |
| 4 0 | 9 2 1 | 8 18 0 | 8 13 11 | 8 9 11 | 8 5 10 | 8 1 10 | 7 17 9 | .. | .. |
| 4 1 | 9 6 2 | 9 2 1 | 8 18 0 | 8 14 0 | 8 9 11 | 8 5 11 | 8 1 10 | .. | .. |
| 4 2 | 9 10 2 | 9 6 1 | 9 2 0 | 8 18 0 | 8 13 11 | 8 9 11 | 8 5 10 | 8 1 9 | .. |
| 4 3 | 9 14 2 | 9 10 1 | 9 6 0 | 9 2 0 | 8 17 11 | 8 13 11 | 8 9 10 | 8 5 9 | .. |
| 4 4 | 9 18 2 | 9 14 1 | 9 10 0 | 9 6 0 | 9 1 11 | 8 17 11 | 8 13 10 | 8 9 9 | .. |
| 4 5 | 10 2 2 | 9 18 1 | 9 14 0 | 9 10 0 | 9 5 11 | 9 1 11 | 8 17 10 | 8 13 9 | .. |
| 4 6 | 10 6 2 | 10 2 1 | 9 18 0 | 9 14 0 | 9 9 11 | 9 5 11 | 9 1 10 | 8 17 9 | 8 13 9 |
| 4 7 | 10 10 3 | 10 6 2 | 10 2 1 | 9 18 1 | 9 14 0 | 9 10 0 | 9 5 11 | 9 1 10 | 8 17 10 |
| 4 8 | 10 14 3 | 10 10 2 | 10 6 1 | 10 2 1 | 9 18 0 | 9 14 0 | 9 9 11 | 9 5 10 | 9 1 10 |
| 4 9 | 10 18 3 | 10 14 2 | 10 10 1 | 10 6 1 | 10 2 0 | 9 18 0 | 9 13 11 | 9 9 10 | 9 5 10 |
| 4 10 | 11 2 3 | 10 18 2 | 10 14 1 | 10 10 1 | 10 6 0 | 10 2 0 | 9 17 11 | 9 13 10 | 9 9 10 |
| 4 11 | 11 6 3 | 11 2 2 | 10 18 1 | 10 14 1 | 10 10 0 | 10 6 0 | 10 1 11 | 9 17 10 | 9 13 10 |
| 5 0 | 11 10 3 | 11 6 2 | 11 2 1 | 10 18 1 | 10 14 0 | 10 10 0 | 10 5 11 | 10 1 10 | 9 17 10 |
| 5 1 | 11 14 4 | 11 10 3 | 11 6 2 | 11 2 2 | 10 18 1 | 10 14 1 | 10 10 0 | 10 5 11 | 10 1 11 |
| 5 2 | 11 18 4 | 11 14 3 | 11 10 2 | 11 6 2 | 11 2 1 | 10 18 1 | 10 14 0 | 10 9 11 | 10 5 11 |
| 5 3 | 12 2 4 | 11 18 3 | 11 14 2 | 11 10 2 | 11 6 1 | 11 2 1 | 10 18 0 | 10 13 11 | 10 9 11 |
| 5 4 | 12 6 4 | 12 2 3 | 11 18 2 | 11 14 2 | 11 10 1 | 11 6 1 | 11 2 0 | 10 17 11 | 10 13 11 |
| 5 5 | 12 10 4 | 12 6 3 | 12 2 2 | 11 18 2 | 11 14 1 | 11 10 1 | 11 6 0 | 11 1 11 | 10 17 11 |

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 6 | 12 | 14 | 5 | 12 | 10 | 4 | 12 | 6 | 3 | 12 | 2 | 3 | 11 | 18 | 2 | 11 | 14 | 2 | 11 | 10 | 1 | 11 | 6 | 0 | 11 | 2 | 0 |
| 5 | 7 | 12 | 18 | 5 | 12 | 14 | 4 | 12 | 10 | 3 | 12 | 6 | 3 | 12 | 2 | 2 | 11 | 18 | 2 | 11 | 14 | 1 | 11 | 10 | 0 | 11 | 6 | 0 |
| 5 | 8 | 13 | 2 | 5 | 12 | 18 | 4 | 12 | 14 | 3 | 12 | 10 | 3 | 12 | 6 | 2 | 12 | 2 | 2 | 11 | 18 | 1 | 11 | 14 | 0 | 11 | 10 | 0 |
| 5 | 9 | 13 | 6 | 5 | 13 | 2 | 4 | 12 | 18 | 3 | 12 | 14 | 3 | 12 | 10 | 2 | 12 | 6 | 2 | 12 | 2 | 1 | 11 | 18 | 0 | 11 | 14 | 0 |
| 5 | 10 | 13 | 10 | 5 | 13 | 6 | 4 | 13 | 2 | 3 | 12 | 18 | 3 | 12 | 14 | 2 | 12 | 10 | 2 | 12 | 6 | 1 | 12 | 2 | 0 | 11 | 18 | 0 |
| 5 | 11 | 13 | 14 | 5 | 13 | 10 | 4 | 13 | 6 | 3 | 13 | 2 | 3 | 12 | 18 | 2 | 12 | 14 | 2 | 12 | 10 | 1 | 12 | 6 | 0 | 12 | 2 | 0 |
| 6 | 0 | 13 | 18 | 6 | 13 | 14 | 5 | 13 | 10 | 4 | 13 | 6 | 4 | 13 | 2 | 3 | 12 | 18 | 3 | 12 | 14 | 2 | 12 | 10 | 1 | 12 | 6 | 1 |
| 6 | 1 | 14 | 2 | 6 | 13 | 18 | 5 | 13 | 14 | 4 | 13 | 10 | 4 | 13 | 6 | 3 | 13 | 2 | 3 | 12 | 18 | 2 | 12 | 14 | 1 | 12 | 10 | 1 |
| 6 | 2 | 14 | 6 | 6 | 14 | 2 | 5 | 13 | 18 | 4 | 13 | 14 | 4 | 13 | 10 | 3 | 13 | 6 | 3 | 13 | 2 | 2 | 12 | 18 | 1 | 12 | 14 | 1 |
| 6 | 3 | 14 | 10 | 6 | 14 | 6 | 5 | 14 | 2 | 4 | 13 | 18 | 4 | 13 | 14 | 3 | 13 | 10 | 3 | 13 | 6 | 2 | 13 | 2 | 1 | 12 | 18 | 1 |
| 6 | 4 | 14 | 14 | 6 | 14 | 10 | 5 | 14 | 6 | 4 | 14 | 2 | 4 | 13 | 18 | 3 | 13 | 14 | 3 | 13 | 10 | 2 | 13 | 6 | 1 | 13 | 2 | 1 |
| 6 | 5 | 14 | 18 | 6 | 14 | 14 | 5 | 14 | 10 | 4 | 14 | 6 | 4 | 14 | 2 | 3 | 13 | 18 | 3 | 13 | 14 | 2 | 13 | 10 | 1 | 13 | 6 | 1 |
| 6 | 6 | 15 | 2 | 7 | 14 | 18 | 6 | 14 | 14 | 5 | 14 | 10 | 5 | 14 | 6 | 4 | 14 | 2 | 4 | 13 | 18 | 3 | 13 | 14 | 2 | 13 | 10 | 2 |
| 6 | 7 | 15 | 6 | 7 | 15 | 2 | 6 | 14 | 18 | 5 | 14 | 14 | 5 | 14 | 10 | 4 | 14 | 6 | 4 | 14 | 2 | 3 | 13 | 18 | 2 | 13 | 14 | 2 |
| 6 | 8 | 15 | 10 | 7 | 15 | 6 | 6 | 15 | 2 | 5 | 14 | 18 | 5 | 14 | 14 | 4 | 14 | 10 | 4 | 14 | 6 | 3 | 14 | 2 | 2 | 13 | 18 | 2 |
| 6 | 9 | 15 | 14 | 7 | 15 | 10 | 6 | 15 | 6 | 5 | 15 | 2 | 5 | 14 | 18 | 4 | 14 | 14 | 4 | 14 | 10 | 3 | 14 | 6 | 2 | 14 | 2 | 2 |
| 6 | 10 | 15 | 18 | 7 | 15 | 14 | 6 | 15 | 10 | 5 | 15 | 6 | 5 | 15 | 2 | 4 | 14 | 18 | 4 | 14 | 14 | 3 | 14 | 10 | 2 | 14 | 6 | 2 |
| 6 | 11 | 16 | 2 | 8 | 15 | 18 | 7 | 15 | 14 | 6 | 15 | 10 | 6 | 15 | 6 | 5 | 15 | 2 | 5 | 14 | 18 | 4 | 14 | 14 | 3 | 14 | 10 | 3 |
| 7 | 0 | 16 | 6 | 8 | 16 | 2 | 7 | 15 | 18 | 6 | 15 | 14 | 6 | 15 | 10 | 5 | 15 | 6 | 5 | 15 | 2 | 4 | 14 | 18 | 3 | 14 | 14 | 3 |

### JOHNSON GRASS AND SORGHUMS.

Johnson grass, like other plants of the sorghum family, will supply bulky succulent feed for dairy cows. Ordinarily, sorghum is, by analysis, low in proteids (flesh formers), and relatively high in carbohydrates (sugars, starch, gums, &c.).

Johnson grass is not rich enough to support dairy cows satisfactorily, and other concentrated foods or lucerne must be added to increase its food-value. Practically all sorghums contain, at certain stages of their growth, a poisonous principle, hydrocyanic acid; plants of this description, particularly when immature (before the seed heads have formed), should be allowed to wilt in the sun before use, to allow any poisonous substances to pass off in a volatile condition. Johnson grass is not recommended for fattening cattle and sheep. It makes a coarse, pithy chaff. Coarseness reduces its value as a hay plant. Good lucerne must be blended with it to increase the palatability of the mixture. Under normal conditions the grass will start growth in the spring and early summer months.

*Summary.*—Johnson grass is likely to prove a serious pest to cultivated land and is not recommended.

## MARKET GARDENING.

### SHORT NOTE ON SEED TESTING.

By J. F. BAILEY, Director of the Brisbane Botanic Gardens.

In a climate like that of Queensland, where rains are experienced during the summer months, it has been found that seeds do not keep so well as they do in places where the reverse is the rule; therefore, when it is stated in works on the subject that certain seeds keep good for a considerable length of time, we must dismiss such from our minds if we desire any measure of success. For instance, here are a few of the cases quoted, as the result of experiments carried out in Great Britain:—Beans, 4 to 5 years; turnip, 3 to 4 years; cabbage, 3 to 4 years; carrot, 3 years. Probably for the reasons given above, the percentage of germination allowed in the Queensland Act has been fixed at a somewhat lower scale than that allowed in other countries.

In testing samples of seeds several important factors must be considered, chief among which are—power and energy of germination, quality, purity, and absence of insect and fungus pests. Energy of germination is an item of great importance. The grower desires an even crop, and this can only be obtained by putting in seed of an even nature, not, as is sometimes done, mixing old seed with new, however good the former may look. In the matter of purity, consideration must be given to the amount of foreign substances included, such as dirt, and, worst of all, seeds of weeds of an injurious character. Every care should therefore be taken by the growers to see that the sample they are about to sow conforms to the foregoing conditions. Most of our leading seedsmen, we are given to understand, are careful to see that the article they

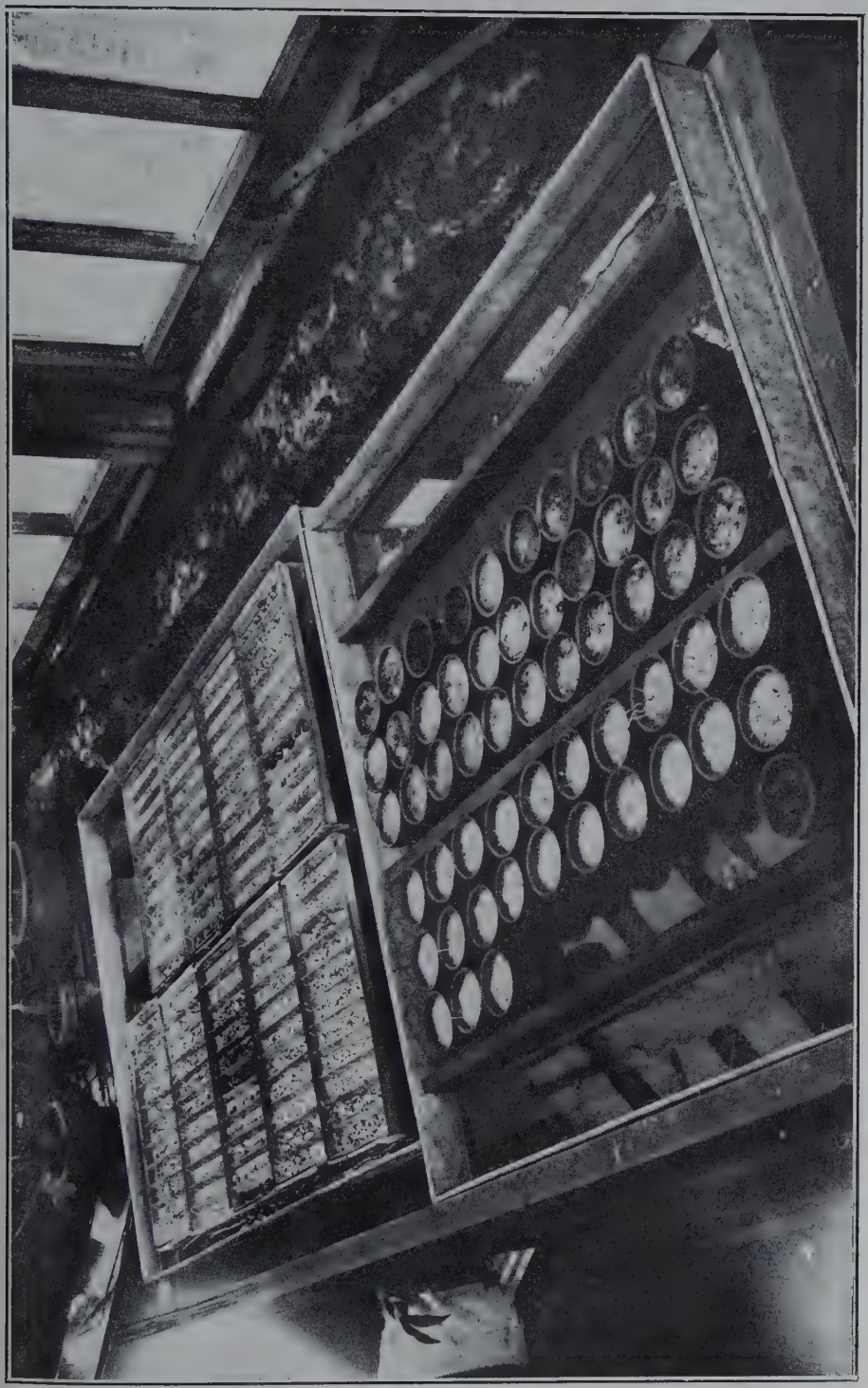

PLATE 15.—SEED TESTING AT THE BOTANIC GARDENS.

sell conforms to the conditions of the Pure Seeds Act, but where any doubt exists in the mind of the grower he should carefully test his seeds before sowing them. From a purity point of view this is, in most instances, simple enough, but in the case of some grasses it becomes a more difficult matter.

Germinating tests are carried out by several very simple methods. It is our usual practice to adopt two methods, so that one may act as a check to the other, and so far we have found it answer well. One is by sowing in earth which has been sterilised by roasting or steaming, and the other by placing the seeds on two thicknesses of thick flannelette placed in the bottom of shallow galvanised trays. These trays are placed on blocks of wood standing in deeper trays in which water is held, and if the flannelette is allowed to go over the ends and into the water, a siphon will be formed which will ensure a continual and even supply of moisture to the material. Plates might be used instead of the trays with equal chance of success.

When planting the seed in earth a general rule to go by is to sow it not more than its own depth of soil, or in the case of grasses, silver sand. The material must be kept continually moist. The trays or pots should be covered with glass, which if darkened greatly assists in the work of germination and is a protection against vermin. Before using, and after each test has been completed, the flannelette should be boiled to ensure its being free from fungus growths.

Poor germinating power may be attributed to several causes. For instance, the seeds may not have been allowed to ripen before being gathered, or too long a time may have elapsed between the time of gathering and sowing, or they may have been exposed in the shops for a considerable length of time, or may have been attacked by insect or fungus pests. Legumes, such as peas, beans, &c., and cereals like maize, wheat, &c., are usually preyed upon by insects in an alarming degree.

[An excellent article on testing seeds, by G. B. Brooks, Instructor in Agriculture, will be found in the May issue of the Journal, 1912.—Ed. Q.A.J.]

## CHICORY.

In the April issue of the Journal we drew attention to the value of chicory, and we showed that the cultivation of the chicory plant is not more troublesome than the growing of carrots, parsnips, or beets. We have since then made inquiries from firms in Brisbane, who are purchasers of this crop, sliced and dried. Before the war the price of the dried root was about £16 per ton. To-day it runs, according to quality, from £24 to £32 per ton. The chief advantages of chicory as a farm crop are, its adaptability to dry, poor soils, its power of growing several large cuts of green food per annum when once established, and its perennial character and easy cultivation. It is hardy, and provides food for stock when other green crops are scarce. A crop of leaves can be cut in the autumn, and afterwards three or four crops per annum will be provided. The plant will last in a productive state for four or five years. From 8 to 10 tons of fresh roots are obtained per acre.

# Dairying.

## THE QUEENSLAND MILKING-MACHINE.

Messrs. Preston and Co., agents for the above machine, are, we understand, receiving satisfactory reports from all districts where the "Shepperson" milking-machine is in use; and it is gratifying to find that the *first* and *only* Queensland patent milker is more than holding its own against the competition of the imported machine, upwards of 10,000 cows being milked each day by this means.

The reason of the marked and immediate success of the "Shepperson" machine is not far to seek; the new patents, as well as improvements, enabled a dairyman with a single "Shepperson" bucket to milk twice as many cows as could be done by the old style of milking-machine, and three times as fast as by hand, the milking being better done, and each cow properly stripped.

All rubber parts can be boiled, thus ensuring absolute cleanliness.

Both the bucket and releaser machines are manufactured of the very best material; and each part—no matter how small—is made by skilled workmen, not boys; so that the machine can be guaranteed in every respect.

Messrs. W. A. Preston and Co., dairy machinery merchants, Brisbane, are the Australasian agents for this machine, and would, we feel sure, be only too pleased to show intending purchasers the machine under construction, or a plant erected and at work on a dairy farm close to Brisbane, or possibly in their own neighbourhood.

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## THE UDDER OF THE COW AND MILKING MACHINES.

The udder of the cow consists of four quarters and four teats, of which a fore and hind quarter constitute a lateral half. The fore and hind quarters of each side, although functionally distinct, have no fibrous division between them. The udder is held in position by broad suspensory bands which attach it to the abdominal tunic, and secondly by the skin which covers it.

The milk vein from each half of the udder unites with its fellow of the opposite side in front of that organ, and immediately afterwards divides to form the two milk veins which pass along the under surface

of the abdomen. The veins of the udder are exceedingly numerous, and so are the lymphatic glands.

The gland tissue is made up of a number of minute vesicles surrounded by a network of minute bloodvessels. The milk is formed in these vesicles and conveyed to a cavity at the base of the teat. These cavities are very small in dry cows, but during lactation they are much increased in size. They hold the milk which is slowly formed during the milking. The teats have thick walls and a single orifice or opening. The walls are composed of skin and a mixture of elastic and unstriped muscular tissue. At the base of each teat the muscle fibres are very few indeed, but increase towards the free extremity, where they form into a band which by keeping the orifice closed prevents the milk from escaping. The inside of the teat is lined by a delicate mucous membrane.

From the above description it will be readily seen that any foreign body introduced into the udder will set up serious complications. In milking, the human hand is the oldest method, but in large herds it is often found to be impossible to get through all the animals unless at great cost—labour. As a result the milking machine has been introduced. Many of these instruments are of great value, as they are worked by suction, thus acting in the same manner as the human hand. A great mistake is made by some people, who think by introducing a foreign body into the teat they will carry off the milk easier and and at less cost. Now, take the construction of the teat as mentioned above, and it will be seen that the teat is lined with a delicate mucous membrane, and unless one understands this thoroughly, there is a grave danger in injuring the membrane and setting up stricture or obliterating the teat altogether.

Another danger one has not to forget in introducing a foreign body into the udder, is the introduction of various germs which set up serious complications. The cow owner would be well advised before inserting any instrument into the udder to take into consideration the anatomy of the gland and teat and also its accompanying dangers.

## SPLIT PEAS.

Special varieties of field peas are grown for split peas, viz.:—Prize-taker, Woodford, Partridge, and Dun. It is somewhat surprising that the cultivation of this crop has not received attention by our farmers, considering the quantities which are imported into Australia every year. There is this much to be said of the crop: That it requires very little labour to prepare the product for the market—merely harvesting, threshing, and winnowing. For split peas, choose those which produce small pods and seeds, divide easily into halves, and of which the skin of the pea is loose. It will be found that, in threshing such kinds, the seeds split in halves, and that, in winnowing, the skins are blown off, leaving the article ready for market.

# The Horse.

## THE CLYDESDALE HORSE.

By P. R. GORDON.

The Clydesdale has unquestionably established itself as the heavy draught horse, *par excellence,* of Queensland. There have been occasional introductions of the heavy English Shire horse, but that breed has never made headway here. It is not contended by modern breeders that the breed is indigenous to Scotland. It is freely acknowledged that it has been evolved from the blood of the Flemish horse engrafted on a native Scottish breed, by skilful breeding. The writer has been fortunate enough to obtain from a gentleman, who made his mark as a Clydesdale breeder in Scotland, some interesting notes on the origin of the breed, and the extent to which additional weight has been imparted to the modern type by judicious selection of English mares, the characteristics of the type, however, having been carefully preservd. Regarding the origin of the Clydesdale, there is a certain amount of doubt concerning the tap root from which the breed originally sprang. Three hundred years of time have left the most enlightened in doubt on certain points, which, however, are now narrowed down to insignificance. That it is a composite breed is not now in dispute, and the only serious argument to the contrary ended when the final evolution started about the beginning of last century. Whether at that time they were the ancient horses of Caledonia graded up with, or without, the assistance of Flemish blood was a matter that was seriously in dispute some hundred years ago. At the present time, however, the only or at least the most important point in dispute is the exact date of the introduction of Flemish blood. One matter is clear. At one time there was a distinct species of horse in Britain—a survival of the fittest. There certainly is no time hinted at when there were no horses in Britain. Another matter that is equally certain is that climate and environment have moulded that common ancestry into variations consistent with the surroundings, and formed a base upon which external influences have gradually evolved a now celebrated breed of horses, famous for general utility from the rising to the setting sun. Given a groundwork of a native race of horses in separate localities, all clearly defined and characteristic of their surroundings, the question that first presents itself is, why should they be called Clydesdales? There can be little doubt that there was a trade of considerable dimensions in horses with the continent in the early Stuart reigns, and that this trade was prosecuted with success by the Douglasses, the ancestors of the ducal line of Hamilton, whose headquarters were in the valley of the Clyde, and the introduction of this foreign influence, together with the conditions of agriculture in Lanarkshire—the valley or dale of the Clyde—at a much earlier date than any other part of Scotland resulted in the first efforts to improve the breed to a standard

sufficient to insure recognition from other parts of Scotland; notably Aberdeenshire and Galloway, both of which districts accepted the superiority of the Lanarkshire or Clydesdale horses, and profited thereby. There is still a strong belief that in the seventeenth century the Duke of Hamilton imported six black stallions from Flanders, and that they were located at Strathaven Castle. This matter gave rise to much discussion in agricultural circles about a hundred years ago, when no trace of their probable existence could be emphatically established by those engaged in the controversy. Strange to say, there was not the slightest shadow of doubt expressed as to the magnitude of the importations into England of the Flemish stallions. Nor was any consideration given to the depredatory raids into England by the adjacent border clans, to whom horses were a valuable commodity, and it is no disgrace to say the Scotchmen held their own in their forays, and no doubt brought many a good English horse to their country. But, in spite of all, a large number of Scotchmen could not be persuaded that there was Flemish or even English blood in their Lanarkshire horses. But a few more years settled matters beyond dispute, and about 1715 the Duke of Hamilton, associated with John Paterson, of Lochlyoch, brought over Flemish stallions from England, and these horses, whatever may have been done before then, exerted such an influence on the native mares that they, practically, brought Clydesdale history down to the early part of the nineteenth century, and handed over a distinct breed of horses ready to be moulded to the ever-changing demands of a progressive country. It will be well to consider the groundwork upon which these Flemish stallions were to exercise their influence, and at an early date two districts stand out prominently where the improvement of draught horses began at a very early age—Galloway and Aberdeenshire. In both these districts the climate and soil favoured horsebreeding, and, given the advantage, even at the present day, of a Galloway or Aberdeenshire up-bringing, the Clydesdale starts in life with a considerable advantage over those of other districts. A new era awoke in the nineteenth century. The Clydesdale now established proved himself the *beau ideal* of a farm horse, but with the advent of the city trade, and more especially of the coal and iron portion of it, a demand sprang up for a heavier horse with the same activity—a horse that could shift his two-ton load with reasonable expediency. Reference has already been made to the importation of Flemish stallions into England, just as they were into Scotland, and that their influence was on one and the same breed. But it is well known the external influences alone will not produce similar effect; environment plays its part, and it did so with a thoroughness just as pronounced as it had done in the resulting difference between the highland garron and a seventeenth century Aberdeenshire draught—till then both of the same strain. The result was that in England there was to be found a class of horses two to three hundredweight heavier than the Clydesdale, and yet of the same breed. With a draught horse of ideal weight, the next step was to see how his other qualifications fitted with the requirements of a dray horse for city use. The Clydesdale was, except his deficiency in weight, the ideal in every other respect.

Scottish breeders always made for good feet, correct pasterns, flinty limbs, and oblique shoulders in their principal objective. They had been breeding and cultivating such for years and had generous assistance from local influences of soil and climate. But in England the demand was for size, and the fens of Lincolnshire lent themselves admirably to that purpose, while neither man nor nature troubled much about the quality of the limbs or the slope of the shoulder. They got the size. It was then that the science of breeding began to tell, and the theory spread that, everything equal in health and vigour, breeding could be controlled to some extent, and desired objects accomplished. The idea that the sire influenced the locomotive and the dam the internal organs of the progeny began to find favour among the more enlightened class of the agricultural community. A very strong proof of this can be seen in the

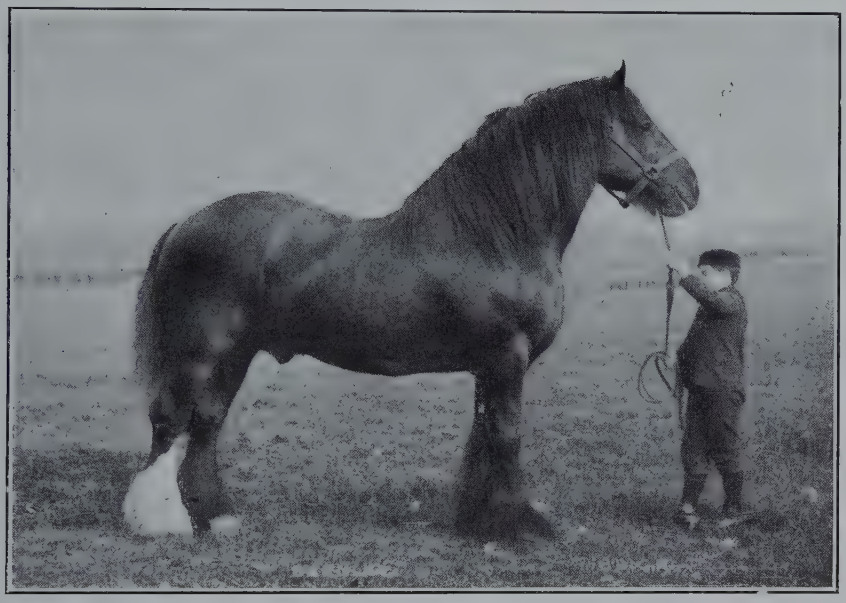

Plate 16.—Darnley, the Greatest Clydesdale of Last Century, and a Champion of Forty Years Ago.

breeding of the mule—the progeny of a donkey and a mare. The resulting mating gives the donkey's legs, tail, mane, ears, braying voice, the bodily structure and respiratory organs of the mare. The reverse form of breeding—the stallion on the she-ass—produces an animal with the horse's legs, tail, mane, neighing voice, and the body and respiratory organs of the she-ass. Whatever doubt there may be about the above theory, history itself is ample manifestation of its success in the breeding of the Clydesdale, and it is not wise to ignore all modern history, for several prominent examples have been apparent of what can be done by judicious care and judgment in draught horsebreeding as well as in other things. And the lesson was not thrown away on the Clydesdale breeders, for Shire mares, by the hundred, were rushed into Scotland to be mated with the Clydesdale stallions for the production of a draught

horse with plenty of size and substance, possessing good legs, feet, pasterns, and the slope of the shoulder that so readily indicates freedom and boldness of action. It was a success—so successful indeed that the demand could not be supplied, and Shire stallions were taken to Aberdeen to cross on the Clydesdales with the sole object of founding a base of brood mares—at the expense of a few faulty geldings, inheriting their sires' locomotive organs—on which the Clydesdale stallions afterwards wrought up to the high state of perfection that they are to be found to-day. So successful was the blending the Clydesdale and Shire for ordinary working purposes, that a few of the Lanarkshire breeders initiated it for stud purposes, and quite a number of Shire mares were introduced to Scotland. The result was just as pronounced as in the former case and, practically, left the landmarks of Clydesdale history.

PLATE 17.—PRINCE OF WALES, A CHAMPION OF A LATER PERIOD.

Darnley, the greatest Clydesdale of the past century, both as a show horse and a breeder, had Southern blood in his veins. Both grand-dams of Prince of Wales were Shire mares. Lork Erskine was, at least, a quarter full of Southern influence and Lord Lyon was half Shire—a first cross. In fact, there is not a registered Clydesdale in Scotland to-day that does not trace to Shire blood in a greater or less degree, while some of the leading successes are saturated with it. The history of the Clydesdale has, therefore, well-defined epochs—a foundation on the stock of ancient Caledonia or Britain; an amelioration to climatic conditions, and a survival of the fittest; the introduction of the Flemish blood at whatever age may be expected; the benefits secured through improved agriculture and better feed; the introduction of a heavier species of close affinities in English blood; and the glorious triumph of

consummated excellence in a draught horse that is, practically, the history of Scotland. The photos accompanying this paper are very interesting as showing the evolving results in Clydesdale breeding during the last half-century. Darnley, as above stated, was the greatest show and breeding horse of last century, and all Clydesdales of the present day—Baron's Pride, Bawn of Bucklyvie among others—are in-bred to him—some severely, others, it is thought, out of reason. Prince of Wales represents a horse bred towards an end, and Marcellus—full of Darnley blood—represents that "end"—the finished article, so to speak.

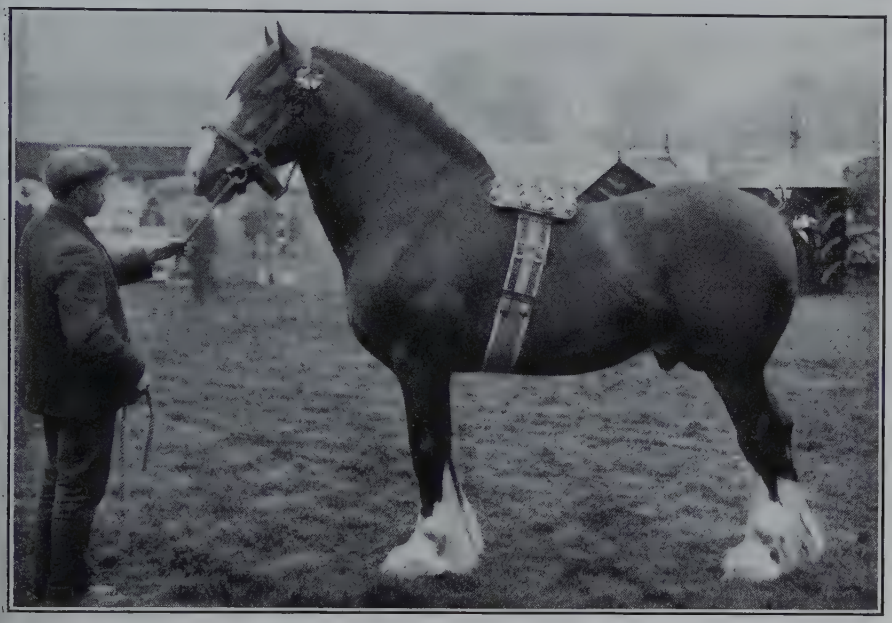

PLATE 18.—MARCELLUS, A CHAMPION OF TO-DAY.

## CURE FOR MANGE IN HORSES.

*Re* a cure for mange in horses, we have at different times given recipes for a cure in this Journal. Amongst these, stabling and grooming are stated to be the best cure. Where this is not possible, oleaginous substances are the most effective applications. Many horses have been cured by daily washings with soft soap. In 1898, Colonel Moore, P.M. at Brisbane (then P.M. at Warwick), applied the following remedy to a horse of his own with complete success:—

Boiled linseed oil 1 pint, sulphur 1 lb., spirit of tar 2 oz. First mix the oil and sulphur, then add the spirit of tar and mix well. Apply with a hard brush or with the hand. Also a teaspoonful of carbolic acid to a pint of lard, stirred in and well mixed. This latter recipe is approved by our veterinary officers.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, MARCH, 1915.

Three thousand nine hundred and sixty-five eggs were laid during the month, making a total for the whole twelve months of 54,202, an average of 1,355 per pen for the forty pens. Coomber's White Leghorns win the first prize with 1,545 eggs, beating Moritz Bros. by one egg. The Loloma Poultry Farm takes third place, being eleven eggs behind the winning pen—a really good finish. T. Fanning's Black Orpingtons win the monthly prize with 141 eggs. A full report of the whole competition will be issued later. The following are the individual records:—

| Competitors. | Breed. | Mar. | Total. |
|---|---|---|---|
| A. T. Coomber | White Leghorns | 95 | 1,545 |
| Moritz Bros., S.A. | Do. | 110 | 1,544 |
| Loloma Poultry Farm, N.S.W. | Do. | 117 | 1,534 |
| T. Fanning | Do. | 97 | 1,488 |
| Geo. Tomlinson | Do. | 110 | 1,478 |
| Marville Poultry Farm, Victoria | Do. | 131 | 1,456 |
| R. Burns | Black Orpingtons (No. 1) | 129 | 1,449 |
| A. H. Padman, S.A. | White Leghorns | 127 | 1,447 |
| Mrs. Munro | Do. | 129 | 1,443 |
| T. Fanning | Black Orpingtons | 141 | 1,441 |
| Cowan Bros., N.S.W. | White Leghorns | 110 | 1,440 |
| E. Le Breton | Do. | 131 | 1,426 |
| A. F. Camkin, N.S.W. | Do. | 103 | 1,422 |
| E. V. Bennett, S.A. | Do. | 127 | 1,416 |
| Derrylin Poultry Farm | Do. | 129 | 1,416 |
| F. McCauley | Do. | 112 | 1,380 |
| R. Burns | S. L. Wyandottes | 118 | 1,379 |
| Loloma Poultry Farm, N.S.W. | Rhode Island Reds | 71 | 1,373 |
| R. Burns | Black Orpingtons (No. 2) | 108 | 1,372 |
| J. T. Coates | White Leghorns | 98 | 1,358 |
| Mrs. Beiber | Brown Leghorns | 84 | 1,352 |
| J. R. Wilson | White Leghorns | 116 | 1,350 |
| J. Franklin | Do. | 105 | 1,348 |
| J. Zahl | Do. | 125 | 1,344 |
| Kelvin Poultry Farm | Do. | 44 | 1,334 |
| J. M. Manson | Do. (No. 1) | 103 | 1,326 |
| J. T. Coates | Black Orpingtons | 94 | 1,319 |
| Range Poultry Farm | White Leghorns | 119 | 1,317 |
| G. E. Austin | Do. | 95 | 1,314 |
| J. Kilroe | Do. (No. 2) | 88 | 1,298 |
| D. Moreton, N.S.W. | Do. | 91 | 1,262 |
| J. D. Nicholson, N.S.W. | Do. | 83 | 1,240 |
| J. N. Waugh, N.S.W. | Do. | 94 | 1,240 |
| Mrs. Bradburne, N.S.W. | Do. | 82 | 1,227 |
| J. Gosley | Do. | 46 | 1,215 |
| R. Jobling, N.S.W. | Do. | 36 | 1,205 |
| J. Murchie | Brown Leghorns | 72 | 1,196 |
| J. Kilroe | White Leghorns (No. 1) | 80 | 1,194 |
| J. M. Manson | Do. (No. 2) | 71 | 1,165 |
| C. M. Jones | Do. | 44 | 1,149 |
| Totals | | 3,965 | 54,202 |

# State Farms.

## WINTER CEREALS, 1914.

By R. E. SOUTTER, Manager, Bungeworgorai State Farm.

The preparation of the seed bed for this season's crop was concluded under difficulties. In the early part of the season the extreme dryness of the soil precluded satisfactory work being accomplished, whilst during the latter portion wet delayed operations considerably. Good germinating rains were experienced in May, followed by good soaking rains in June and July, accompanied by mild weather, resulting in crops making heavy growth. Unfortunately, these conditions were followed by a spell of dry weather during August and September, which reduced the ultimate yields somewhat, and resulted in the season being very early. Ideal weather for harvesting prevailed.

The following is a record of the precipitation for the twelve months ending 30th November, 1914:—

| Month. | Wet Days. | Total Precipitation. | As per Fall. |
|---|---|---|---|
| December | 11 | 1·67 | ·151 + |
| January | 6 | ·82 | ·136 + |
| February | 13 | 5·92 | ·455 + |
| March | 10 | 3·98 | ·398 |
| April | 5 | 1·74 | ·348 |
| May | 8 | 1·43 | ·18 — |
| June | 8 | 2·38 | ·297 + |
| July | 7 | 1·18 | ·17 — |
| August | .. | .. | .. |
| September | 5 | ·58 | ·116 |
| October | 5 | 1·36 | ·272 |
| November | 6 | 1·23 | ·205 |
| Total | 84 | 22·29 | |

### MANURIAL EXPERIMENTS.

The season 1914 was such that the nitrogenous manures, or the combinations containing such, gave the best results, whilst the benefits accruing from the use of phosphatic manures alone was infinitesimal, and were the same returns and differences obtained every season the use of artificial fertilisers would not be advocated. Such results only demonstrate how necessary it is to thoroughly test over a number of seasons everything supposed to influence the ultimate yields of different farm crops. Had any private individual manured his crop for the first time this year and obtained similar results, it would not be wondered at if he did not apply fertiliser next season. No doubt many in the past have entered into something similar and have had the anticipated results nullified in the same way, with the result they went back to the old methods, and in most instances still practise them. The preparation of the land whereon the following tests were made was as follows:—

Ploughed, January, last week, 5 in. to 6 in. Disc harrowed, April, first week, harrowed. Cultivated (one way), May, first week, 4 in., harrowed. Seed sown, 11th May. Variety, Bunge No. 1, treated 2 per cent. solution bluestone and dipped in lime water as a prevention against smut. Rate seeding, 37 lb. per acre. Germinated, peeping 17th. Harvested, 19th and 20th October. Crop harrowed once, 26th May.

| Manure. | Cost. | Yield per Acre, 1914. | Yield Average, 5 Years. | Remarks. |
|---|---|---|---|---|
| | | Bushels. | Bushels. | |
| 1. Shirley's No. 1 Cereal Manure—<br>1 cwt. per acre .. .. .. .. | 0 11 0 | 20·5 | 22·1† | Earing, 24th August, evenly ; crop nice, even ; foliage light in colour ; little rust lower flag ; height, 3 ft. ; straw fairly fine ; crop thin ; head good, fairly well filled ; grain good. |
| 2. Shirley's No. 1 Cereal Manure—<br>1 cwt. per acre .. .. ..<br>½ cwt. Nitrate of Lime .. .. | 0 17 9 | 23·5 | 24·0† | Earing, 24th August, evenly ; crop even ; colour foliage much darker in colour than No. 1 ; rust lower flag ; straw fairly fine, slightly taller than No. 1 ; heads good, fairly well filled ; grain good. |
| 3. Shirley's No. 1 Cereal Manure—<br>½ cwt. per acre .. .. ..<br>½ cwt. Nitrate of Lime .. .. | 0 12 3 | 24·20 | 24·7† | Earing unevenly, 24th August ; colour foliage good in appearance ; heavier crop, slightly uneven ; little more rust than 1 and 2 on lower flag ; height, 3 ft. ; head good, fairly well filled ; grain good. |
| 4. Control (unmanured) .. .. .. | .. | 21·6 | 19·8† | Earing unevenly, 24th August ; crop uneven ; colour lighter than 2 and 3 ; crop uneven, thin ; straw fine, little flag ; very little rust ; height, 2 ft. 6 in. to 3 ft. ; heads good, fairly well filled ; grain good. |
| 5. 1 cwt. Superphosphate .. .. .. | 0 7 0 | 22·4 | 22·9† | Earing evenly, 24th August ; crop even, thin, straw fine ; colour similar to 4 ; little flag ; very little rust ; height, 3 ft. ; heads good, fairly well filled ; grain good. |
| 6. Thomas's Phosphate .. .. .. | 0 5 6 | 22·6 | 20·8 | Earing evenly, 24th August ; crop fairly even, thin ; straw fine ; colour similar to 5 ; little flag ; very little rust ; height, 3 ft. 6 in. ; head good, fairly well filled ; grain good. |
| 7. Stable manure, 15 tons .. ..<br>Superphosphate, ½ cwt. .. | 2 8 6 | 26·6† | 22·3 | Germination 1 to 2 days earlier than other blocks ; earing unevenly, 26th to 29th August ; crop very thick, very flaggy, straw coarse ; crop uneven, height from 2 ft. 6 in. to 3 ft. 6 in. ; felt dry spell very much ; a goodly portion of the crop was tips withered and ears failed to just more than clear shot |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | blade; heads poorly filled and grain pinched; had a good fall of rain been experienced in the latter part of August, it is considered this plot would have produced at the rate of between 35 and 40 bushels per acre. The application of this manure has so improved the mechanical condition of the soil here as to render it workable when the implements in use will hardly scratch that adjacent. It is intended to omit the application during 1915. |
| 8. Superphosphate, 1 cwt.<br>Nitrate of Lime, ½ cwt. | 0 13 9 | 24·12 | 21·0† | Earing unevenly, 26th August; crop uneven owing to great inequalities in soil which peculiarities of seasons made more pronounced; height, 2 ft. 6 in. to 3 ft.; fairly flaggy in places; rust on lower flag; head fairly well filled; grain fairly good. | |
| 9. Nitrate of Lime, ½ cwt.<br>Superphosphate, 1 cwt.<br>Sulphate of Potash, ½ cwt. | 1 1 9 | 24·4 | 18·9 | Earing unevenly, 26th August; crop uneven; other remarks as applied to 8. | |
| 10. Dried Blood, ½ cwt.<br>Superphosphate, 1 cwt.<br>Sulphate of Potash, ½ cwt. | 0 19 6 | 25·6 | 21·3 | Earing fairly evenly, 26th August; crop more even than 9; height, about 3 ft.; fairly flaggy in places; grain good; heads well filled. | |
| 11. Control (unmanured) | .. | 22·6 | 19·8 | Crop earing very unevenly, 24th August; height very uneven, from 20 in. to 3 ft. 6 in.; flaggy in places; inequalities of soil very clearly shown in crop; rusty in places on lower flag; heads fairly well filled; grain uneven, some slightly pinched where crop tip withered. | |
| 12. Dried Blood, ½ cwt.<br>Thomas's Phosphate, 1 cwt.<br>Sulphate of Potash, ½ cwt. | 0 18 0 | 26·2 | 22·5 | Crop earing fairly even, 24th August; height uneven, 3 ft. to 4 ft. 6 in.; flaggy in places; crop now thick; rusty lower flag where crop inclined to be flaggy; heads well filled; grain good. | |
| 13. Dried Blood, ½ cwt.<br>Sulphate of Potash, ½ cwt.<br>Superphosphate, 1 cwt.<br>Nitrate of lime, ½ cwt. | 1 6 3 | 27·1 | 22·5 | Crop earing fairly evenly, 24th August; height, uneven, 3 ft. 6 in. to 4 ft. 6 in.; block inclined to be flaggy; crop fairly thick; rusty, lower flag; head well filled; grain good. | |

NOTE.—It will be noticed that, notwithstanding that the soils of the two Control Blocks Nos. 4 and 11 are totally different—No. 4 being a sandy loam, whilst No. 11 has clayey soil, a clay pan, and a sandy loam rich in humus within its boundaries—the average yield for the two blocks over the 5 years is exactly the same.

Block 4.—Unmanured

Block 6.—Thomas's Phosphate. Yield, 22·6 bushels per acre.

PLATES 19 AND 20.—WINTER CEREALS AT ROMA STATE FARM.

Block 7.—Stable Manure, 15 tons per acre; ½ cwt. Superphosphate.
Yield, 26·6 bushels per acre.

Block 12.—Dried Blood, ½ cwt.; Thomas's Phosphate, 1 cwt.; Sulphate of Potash, ½ cwt.
Yield, 26·2 bushels per acre.

Plates 21 and 22.—Winter Cereals at Roma State Farm.

## NOTES FROM KAMERUNGA STATE NURSERY FOR MARCH, 1915.

The Manager reports as follows:—

*Meteorological.*—Rainfall, 3·72 in., the average for the last 25 years being about 19 in.

Maximum temperature, 91·5 degrees.

Minimum temperature, 62 degrees.

Owing to the very dry conditions which have prevailed during the last three months, many crops have been partial or total failures. Gingers are almost a failure, being very late and growth weak.

*Coffee.*—The young trees are still looking well owing to the attention given to them; but the dry season has had the effect of making the crop ripen early, picking having already started, and anyone requiring seed should apply at once. Seed sown now should produce plants for putting out about October, provided moist enough conditions prevail. Ordinarily, I consider the end of June or beginning of July the best months to form nursery seed beds for coffee. Plants raised then would be ready for planting out from January on; but seed maturing now, if kept to that date, would be much weaker in germinating power than if sown during this month or May.

Some excellent young plants of the Tonquin Bean (*Dypterix odorata*)—raised from seed at the Brisbane Botanic Gardens—were received and planted out both at this Nursery and other parts of the Cairns and Mossman districts.

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## CHAMPION AYRSHIRE BULL—BRAE RISING STAR.

Mr. Thos. Jones, Manager of the State Farm, Warren, supplies the following interesting information on the pedigree of the sire of the newly imported Ayrshire bull Sun Yat, now available for service at the farm:—

BRAE RISING STAR, No. 8187, at 3 Years Old.

This great bull was champion Ayrshire bull of Scotland for the years 1911 and 1912, and is the sire of the recently imported bull Sun Yat 12501, at present situated at this farm.

The following notes may interest the breeders of Ayrshire cattle in Queensland:—

I have just received a letter from Mr. Howie, of Hillhouse, Kilmarnock, giving me some very interesting news concerning Brae Rising Star, as follows:—

Mr. Howie sold this great bull to Mr. Clements, of Netherton, in 1912, for £450, and has repurchased him for £500 to head his great herd

at Hillhouse. This step was taken when it was seen that the bull's progeny were likely to make good yielders. Three of his heifers have just finished their first year's records, as follows:—

Tibby II., champion as a 2 year old, 9,210 lb. milk, with 3·7 per cent. butter fat.

Blossom, 8,007 lb. milk, with 3·8 per cent.

Flossie, 9,099 lb. milk, with 4·2 per cent.

Brae Rising Star's dam, Whitehill Lily II., 17511, exported to U.S.A. in 1910. Record as a 4 year old, 856 gallons of milk, with 3·8 per cent., in 38 weeks.

Plate 23.—Ayrshire Bull, Brae Rising Star, at Three Years Old.

Mr. Howie mentions that with daughters like these the bull was cheap at £500.

The dam of Sun Yat, Knockterra Carolina 31626, on her first calf gave 8,391 lb. milk, with 3·8 per cent. (she calved in midwinter).

The newly imported bull Sun Yat is now available for service at Warren State Farm.

## DISEASES AND TREATMENT OF ANIMALS.

The best book for the information of the stockowner on the diseases and treatment of animals is "Leeny's Home Doctoring," which may be obtained from Thomson Bros., booksellers, George street, Brisbane. The Agricultural Department does not issue books on diseases, but publishes pamphlets on various stock ailments common to this country. Useful information on these subjects is given in the "Queensland Agricultural Journal."

# The Orchard.

## BANANAS AT BUDERIM MOUNTAIN.

Through the courtesy of the Under Secretary, Department of Public Instruction, we are enabled to publish the following interesting annual return of banana manurial experiments at the Woombye State School, Buderim Mountain. The following useful deductions may be made therefrom:—

1. That as the supply of food in the soil is used up in "No Manure Plot" the returns show a decided falling away, which will be greater each year. Hence banana growing even on fairly good land soon becomes unprofitable if systematic manuring is not resorted to. (Plot land by analysis reported "very fair soil.")

2. That the supply of available potash in the soil is becoming exhausted in "No Potash Plot." (This plot produced average bunch last year, almost equal to "Complete Manure Plot.") As a result, a greater gap may be noticed this year in returns from "No Potash Plot" as compared with "Complete Manure No. 1 Plot." Hence manuring with "meatworks manure," "fertiliser," and such-like pays, but only to extent of £10 per acre, as compared with £93 when potash is added.

3. That, seeing no manure was applied till the latter part of November, complete manure with dried blood as a source of nitrogen is of more lasting benefit than complete manure with nitrate of lime as the nitrogen base.

In conclusion, it is gratifying to report that still greater interest on the part of local growers is being shown in the experimental work done, while those who have lately bought farms in the district are trusting wholly to the advice and information supplied at the school.

ANNUAL RETURN OF PLOT.

1st March, 1914, to 28th February, 1915.

| —— | No Manure. | No Potash. | Complete. No. 1. | Manure. No. 2. |
|---|---|---|---|---|
| No. of stools .. .. .. | 7 | 7 | 7 | 22 |
| No. of bunches .. .. | 13 (15) | 14 (16) | 23 (20) | 61 (53) |
| No. of dozen .. .. .. | 134½ (206) | 172½ (242) | 332 (303) | 790 (819) |
| Average per bunch .. .. | 10·3 (13·7) | 12·3 (15·1) | 14·4 (15·2) | 12·9 (15·4) |
| Average per stool .. .. | 19·2 (29·4) | 24·6 (34·5) | 47·4 (43·2) | 35·9 (37·2) |
| Value at 3d. per dozen { per stool | 4s. 9½d. (7s. 4d.) | 6s. 1½d. (8s. 7½d.) | 11s. 10d. (10s. 9½d.) | 8s. 11½d. (9s. 3d.) |
| { per acre | £71 17s. 6d. (£123 6s. 8d.) | £91 17s. 6d. (£150 18s. 9d.) | £177 10s. (£188 17s. 1d.) | £134 7s. 6d. (£162 12s. 8d.) |
| Increase due to manure { per stool | .. | 1s. 4d. (1s. 3½d.) | 7s. 0½d. (3s. 5½d.) | 4s. 2d. (1s. 11½d.) |
| { per acre | .. | £20 (£27 12s. 1d.) | £105 12s. 6d. (£65 10s. 5d.) | £62 10s. (£39 5s. 5d.) |
| Gain after paying for manure { per stool | .. | 9½d. (9) | 6s. 4d. (2s. 9d.) | 2s. 10d. (7½d.) |
| { per acre | .. | £10 11s. 6d. (£18 3s. 7d.) | £93 6s. (£53 3s. 11d.) | £39 6s. (£16 1s 5d.) |

NOTE.—1. For this year's return 300 stools to an acre were counted; last year 350 stools were counted.
2. Figures in brackets are returns for year 1913-1914.
3. Manure was applied in November only, so that returns are practically from manure applied in the year 1913-1914.

(Sgd.) REG. G. BARTLETT,
Head Teacher,
State School, Buderim Mountain.

# Science.

## SOURCES OF COMMERCIAL POTASH.

With the check to imports of German potash caused by the war, and the consequent rise in price of all potash salts, American manufacturers may find it necessary to consider domestic sources of supply.

Most of the potassium compounds used in pharmacy to-day are derived in the first instance from the famous salt deposits of Stassfurt, Germany, where the element occurs as potassium chloride, in the mineral called silvine, and as magnesium-potassium chloride in carnallite. The "potash" of commerce is obtained by the leaching of ashes from land plants, the ashes of sugar beets from molasses residues, and in the purifications of sheep suint. The product of wood ashes is purified by repeated crystallisation from hot water and enters the market as "pearl-ash."

In a recent issue of the "Scientific American," a correspondent drew attention to beet-sugar molasses as a source of commercial potash and suggested that the production of potash salts from beet-sugar refuse might be profitably carried on in this country.

The French sugar-beet sugar contains a notable proportion of potash salts, and the recovery of potash from the waste material of the stills used in treating beet-sugar molasses was an industry of some importance prior to the introduction of German potash, which became available in far greater abundance than was possible with beet-sugar refuse.

It may, therefore, be opportune to direct attention to early efforts in this country to provide material for the manufacture of potash salts. In a paper contributed to the American Pharmaceutical Association in 1892, Prof. John Uri Lloyd recalled the fact that American potash was formerly an article of much importance, and was exported from this country in large quantities. Years ago a well-known American firm manufactured yellow prussiate of potash on a large scale. In the beginning of the work the crude potash was obtained principally from Michigan from forest stumpage, the ashes of the stumps being collected and leached in the final clearing up of the land. This potash, as shown in the paper by Prof. Lloyd, already referred to, was, as a rule, mixed with more or less common salt, in some instances being extraordinarily adulterated. The German potash, both carbonate and caustic, came along about the time the Michigan source was exhausted, and has continued to be used in chemical factories generally. Now that a scarcity of German supply impends it would seem that there must be an opportunity for the development of potash manufacture as a by-product of the beet-sugar industry, provided the American molasses of the beet contains the same proportion of potassium that was evidently present in the French sugar beet. Prof. Lloyd states that his firm used considerable quantities of beet potash imported from France, and the material was equal to the

German as a basic substance for the manufacture of yellow prussiate of potash, though, naturally, the supply was somewhat irregular. Prof. Lloyd thinks it likely that the crude molasses of the South contains an abundance of potash, which, if there is a contained famine in German potash, might well be investigated.

Meanwhile, it is encouraging to note from a recent statement by Secretary Lane of the Department of the Interior, that the home production of potash will be started at a plant in Searles, Cal., at an early date. The initial output will be only 5 tons a day, but the plant under construction is expected to ultimately produce 120 tons.—"Scientific American."

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## "THE SOILS OF NEW SOUTH WALES."

By H. I. JENSEN, D.Sc., Government Geologist of the Northern Territory, late of the Chemist's Board, N.S.W. Department of Agriculture.

By direction of the Minister of Agriculture of New South Wales, a most valuable book on "The Soils of New South Wales" has been issued, which is without doubt a very important addition to the literature of soil geology. The author, Mr. H. I. Jensen, has for over twenty years been engaged in the collection and analysis of farmers' soils throughout the mother State, and has now embodied in the above work the results of his researches. After pointing out how physical, biological, and chemical forces exert their influence in what is known as "rock-weathering," he shows how, whilst soil is continually being formed by these processes, it is also continually being removed by the kindred process of soil waste under the same influences, although biological agencies which stimulate rock-weathering do not favour soil waste to the same extent. "Indeed, many of them tend rather to hold back the soil, and to prevent it from being swept into the creeks. No doubt the movements of worms and other soil fauna, and the secretions of small animal organisms, bacteria, algae, and fungi in the soil, help to comminute it; but in so doing they render it more favourable to the growth of plants. Plants are active restrainers of soil waste . . . . their network of roots and their organic products of decay have the effect of binding the soil and of preventing its being swept away by heavy rains."

A valuable lesson on the connection between forests, floods, and rainfall, which should have been learned years ago by settlers, is given as to the devastation caused by floods due to the destruction of large areas of timbered country traversed by flooded rivers, but where the rainfall has annually lessened in proportion as the land is denuded of timber. We, in Queensland, have had bitter experience of the results of land clearing, in the washing away of the rich soil into the rivers and creeks, leaving the scrub farms in an impoverished state owing to the loss of the surface soils.

"Thus," writes the author, "man is an active promoter of soil waste, often quite unconsciously and with the best of intentions. By clearing forests on hill sides, he loosens the soil, and leaves it exposed

to torrents, which sweep it down more rapidly than rock decay replaces it. By cutting drains he often starts a storm-water channel which removes his soil at an alarming pace. By ploughing in the direction of the slope instead of at right angles to it, he hastens soil waste. By neglecting to maintain forest belts as wind-breaks, he allows prevalent winds to carry away the most fertile particles of soil from his newly-ploughed fields."

"Clearing the forests and draining and ploughing the lands are necessary proceedings to human existence. These things can, nevertheless, be done without skinning Nature—without giving the forces of destruction full play. Just as by our action we can call into operation the forces of Nature that destroy the soil, and ruin the land from an agricultural point of view, so we can, by a careful study of the country, so modulate our work that the forces of Nature will help us to preserve just as much of the soil as we require."

We quote in particular the above portions of the book, as they are of vital importance to the agriculturist and pastoralist, and may very easily be understood. Other chapters equally absorbing are devoted to a technical description of soils, to manures and their application, to irrigation and artesian wells, and a description of the alluvial soils of New South Wales, which apply equally to most of the soils of Queensland. The work, which is well illustrated, must prove of great value not only to the scientific reader, but also to the man on the land.

## AUSTRALIAN WHEAT.

The following notes on the wheat position in Australia are taken from the "Producers' Agency" circular issued by H. M. Suttor and Company, Sydney:—

The wheat harvest of Australia, if it can be called such, for the past season, works out at about 25,053,950 bushels, provided that the crop of New South Wales was not less than 14,000,000 bushels. Victoria accounts for 3,940,950; South Australia, 2,600,000; West Australia, 2,513,000; Queensland, 1,500,000; Tasmania, 500,000. The requirements for food and seed will not be less than 35,000,000 bushels, which leaves a deficiency of about 10,000,000 bushels to be imported. This is the greatest all-round failure since 1902, when the total yield was 12,378,000 bushels; with the different and unusual result that New South Wales has more than the total of all the other States together. In the previous harvest the yield was 103,350,000 bushels. Past wheat history shows that heavy yields follow failures, and the probability is that the 1915 crop will be a heavy one also. In 1903 the imports of wheat were 9,115,000 bushels. Flour, 70,000 tons; total valued at £2,600,000. This year the import will probably reach a value of £4,000,000. Last year our exports of wheat and flour were valued at £11,500,000, so that Australia, as compared with last year, will have a direct wheat loss of £15,500,000.

The High Court has decided that the Wheat Acquisition Bill, which the Interstate Commission declared invalid, is valid, and stands good.

# Entomology.

## COPING WITH THE CANE GRUB.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. E. Jarvis, Entomologist to the Bureau:—

During the coming autumn and winter it is proposed, as stated last month, to investigate some of the more promising means of coping with the grub stage of cane beetles, and it may not be out of place in the present report to introduce this side of the question to our growers by briefly enumerating the various recognised control measures that may be brought to bear on such research work, and which employed collectively could hardly fail to produce highly beneficial results.

I have previously pointed out that ideal methods of combating this notorious beetle are admittedly those in which we succeed best in preventing oviposition by destroying as many egg-laden females as possible; but at the same time it would be well to bear in mind that the greater length of the larval existence compensates to some extent for its secondary importance, since it enables us to practise control measures throughout a period of at least six months whilst the sphere of action of the pest underground is greatly restricted, and it is subjected also to the injurious influences of certain forms of climatic and natural control that do not affect the adult beetle stage.

In the list given below I have attempted to arrange the principal preventive and remedial methods in numerical order of merit, determined by their relative claims to efficiency and practicability although irrespective of individual value at the present time. No. 3, for example, is already extensively practised and of great economic importance, but theoretically No. 1, which is still in the experimental stage, must ultimately prove superior to it, as under such ideal soil treatment many larvæ would succumb a few days after hatching and the remainder before being able to work appreciable damage; whereas on the other hand grubs exposed to view while ploughing or pulling up stools, &c., represent but a small proportion of the number actually present in the soil, and many, being of fair size, have already injured the crops; moreover, such destruction of second and third stage larvæ entails the probable loss of a small percentage of useful parasites.

### CONTROL OF GRUB STAGE.

#### Direct and Remedial Methods.

1. Incorporating with the whole of the soil by ploughing and other cultural operations some enduring substance (preferably cheap and non-poisonous) that shall prove quickly fatal to grubs and at the same time possess manurial properties.
2. The application to cane sets or furrows of an inexpensive deterrent sufficiently obnoxious and durable to protect a limited area containing main roots from invasion during most of the growing season.

4. Fumigation of the soil with a gas deadly to animal life but having, if possible, a stimulating effect on vegetation.

7. Applying an insecticidal solution to the main roots by pouring same into a trench against base of stools.

Whilst striving to attain ideal results from an application of such speculative remedies as Nos. 1, 2, 6, we must not neglect the claims of more practical though commonplace control measures, some of which, in addition to being easily carried out, cost comparatively little and are beneficial both from a cultural as well as an entomological standpoint (*see* Nos. 3, 5, 8, 9). All influences affecting the economy of cane grubs as a direct result of agricultural operations should be closely studied, the probability being that future developments in this connection may lead to issues of the first importance. Results brought about by such factors, for instance, as the physical character of soils, manuring, &c., are naturally influenced more or less by weather conditions which tend to regulate the subterranean movements and position of grubs and thereby affect indirectly the habits of their parasitic enemies.

### Preventive Methods.

3. Collecting grubs by hand whenever possible, both from behind the plough and under trash in hot weather.

5. Working the soil, if practicable, whenever grubs are known to be close to the surface and can easily be exposed to the influence of intense solar heat and attack from natural foes.

8. Encouraging a vigorous root development and conditions favourable to conservation of moisture by judicious manuring and thorough cultivation.

10. Maintaining the soil in a friable state and free from weeds throughout the growing season.

A large percentage of cane grubs perish annually, as a necessary outcome of the controlling influence of various natural laws designed to prevent their undue increase. Unfortunately the establishment of artificial conditions and consequent destruction of native flora over vast tracts of country has interfered with the complex workings of these laws, with the result that our grey-back beetle and other insects, being induced to substitute cultivated plants for their natural food, have gradually acquired a liking for the former and become serious pests.

The following procedure will serve in a measure to counteract this evil:—

### Natural Control.

6. Infecting the soil artificially with the "Green Muscardine" fungus, or with other parasitic diseases that may be found readily procurable and sufficiently effective to warrant the expense of such distribution.

9. Promoting the protection of all indigenous grub-eating mammals and birds; together with the preservation when feasible of insect enemies of cane beetles.

11. The introduction from other countries of special parasitic and predaceous insects that are known to attack grubs of scarabæidæ closely related to our own species.

12. The destruction where practicable of a large bombylid hyperparasite which materially checks the increase of our parasitic "digger wasps" by preying on the larvæ of these useful insects.

Other methods of controlling the grub stage of cane beetles could be mentioned, but the twelve already enumerated will enable growers to realise the nature of operations likely to be serviceable when fighting the larval form of this pest.

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF MARCH IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING MARCH, 1915 AND 1914, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | | Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|---|---|---|---|---|
| | Mar. | No. of Years' Records. | Mar., 1915. | Mar., 1914. | | Mar. | No. of Years' Records. | Mar., 1915. | Mar., 1914. |
| *North Coast.* | In. | | In. | In. | *South Coast*—continued: | In. | | In. | In. |
| Atherton ... ... | 9·55 | 13 | 0·69 | 13·10 | | | | | |
| Cairns ... ... | 20·20 | 27 | 4·74 | 14·81 | Nanango ... ... | 3·75 | 27 | 0·12 | 5·34 |
| Cardwell ... ... | 15·65 | 27 | 0·99 | 28·70 | Rockhampton ... | 5·54 | 27 | 0·03 | 5·53 |
| Cooktown ... ... | 15·17 | 27 | 2·58 | 16·34 | Woodford ... ... | 9·29 | 27 | 0·06 | 6·34 |
| Herberton ... ... | 8·62 | 27 | 0·58 | 14·01 | Yandina ... ... | 10·82 | 21 | 0·06 | 11·06 |
| Ingham ... ... | 16·04 | 22 | 3·87 | 43·66 | | | | | |
| Innisfail ... ... | 26·78 | 27 | 3·44 | 24·96 | | | | | |
| Mossman ... ... | 25·26 | 5 | 4·80 | 32·31 | *Darling Downs.* | | | | |
| Townsville ... ... | 8·58 | 30 | 0·02 | 14·34 | | | | | |
| | | | | | Dalby ... ... | 3·65 | 27 | 0·39 | 3·55 |
| | | | | | Emu Vale ... ... | 2·99 | 17 | 0·13 | 6·40 |
| *Central Coast.* | | | | | Jimbour ... ... | 2·84 | 24 | 0·25 | 2·17 |
| | | | | | Miles ... ... | 3·07 | 27 | Nil | 3·32 |
| Ayr ... ... ... | 8·40 | 27 | 0·17 | 11·24 | Stanthorpe ... | 3·33 | 27 | 0·36 | 6·08 |
| Bowen ... ... | 6·43 | 27 | 0·09 | 7·58 | Toowoomba ... | 4·68 | 27 | 0·27 | 4·28 |
| Charters Towers ... | 3·92 | 27 | 2·32 | 4·09 | Warwick ... ... | 3·07 | 27 | 0·80 | 6·31 |
| Mackay ... ... | 11·47 | 27 | 2·37 | 13·35 | | | | | |
| Proserpine ... ... | 14·69 | 11 | 1·35 | 17·77 | | | | | |
| St. Lawrence ... | 6·71 | 27 | Nil | 2·87 | *Maranoa.* | | | | |
| | | | | | | | | | |
| | | | | | Roma ... ... | 4·09 | 25 | 0·10 | 2·05 |
| *South Coast.* | | | | | | | | | |
| | | | | | *State Farms, &c.* | | | | |
| Biggenden ... ... | 4·89 | 14 | Nil | 11·09 | | | | | |
| Bundaberg ... ... | 6·40 | 27 | 0·07 | 5·60 | | | | | |
| Brisbane ... ... | 6·09 | 64 | 0·11 | 7·75 | Gatton College ... | 4·22 | 14 | 0·64 | 3·88 |
| Childers ... ... | 5·64 | 19 | 0·15 | 10·49 | Gindie ... ... | 3·06 | 13 | 0·07 | 2·91 |
| Crohamhurst ... | 13·44 | 22 | 0·25 | 16·92 | Kamerunga Nurs'y | 18·24 | 23 | 3·72 | 17·76 |
| Esk ... ... ... | 5·39 | 27 | 0·48 | 3·83 | Kairi ... ... | 6·11 | 2 | 0·75 | 11·46 |
| Gayndah ... ... | 3·90 | 27 | Nil | 9·98 | Sugar Experiment Station, Mackay | 13·53 | 16 | 3·97 | 12·49 |
| Gympie ... ... | 7·21 | 27 | 0·02 | 9·73 | | | | | |
| Glasshouse M'tains | 11·69 | 6 | 0·10 | 11·25 | Bungeworgorai ... | 1·99 | 2 | Nil | 3·98 |
| Kilkivan ... ... | 4·74 | 27 | Nil | 8·93 | Warren ... ... | 2·16 | 2 | Nil | 4·32 |
| Maryborough ... | 7·23 | 27 | 0·29 | 12·74 | Hermitage ... | 3·42 | 7 | 0·46 | 5·88 |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for March this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

# General Notes.

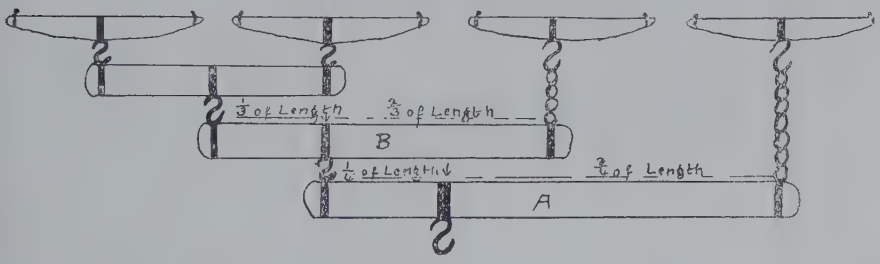
## GOONDIWINDI PASTORAL AND AGRICULTURAL SOCIETY.

The secretary notifies that in consequence of the continued dry weather, the show fixed for 21st and 22nd April had to be abandoned.

## DESTROYING WHITE ANTS.

There is no need to make a solution of arsenic to destroy white ants. It is best to use dry arsenic and put a small quantity into places where the ants are working. By simply putting a knife point full into one of the cracks in stumps, or into their working channels, the whole lot may be poisoned, as the live ants eat the poisoned ones.

## A FOUR-HORSE PLOUGH BAR.




A to be divided into four equal parts.

B to be divided into three equal parts.

Bar marked A to take draught at ¼ from end, and bar marked B to take draught from ⅓.

Width of one-horse bars left to discretion of user, according to class of horse (medium or heavy draught) used.

Above is an illustration of a four-horse bar for a plough, so arranged that the right-hand horse can walk comfortably in the furrow, and the other three on the land. Drawn by Mr. A. E. Gibson, of this Department.

# Answers to Correspondents.

## UTILISING WILTED MAIZE CROPS.

Y. V. H., Mundubbera—

Wilted crops of maize such as yours can be most profitably turned to account by making into ensilage; but as you state you do not possess any stock this phase of the question cannot be taken account of. Maize cut and cured into a form of hay, in stooks, makes a useful chaff-forage for dairy stock, particularly when they have access to other classes of richer foods like lucerne or cowpeas. There is no sale for maize chaff under normal conditions in Queensland. It is entirely a product for use on the farm.

When maize fails to set a crop of grain, the only alternatives are those mentioned above, or else the fodder can be cut and fed direct to stock.

## BEANS, PEAS, AND GREEN CROPS FOR ENRICHING THE SOIL.

F. J. HULL, Cardwell—

Mr. H. C. Quodling, Inspector of Agriculture, replies as follows to your questions:—

*Q.* 1.—Whether your department supplies manure to farmers, and if so at what price? Can you supply 1 ton of meatworks manure?

*A.* The department does not deal in manures, but most meatworks sell their fertilisers in small lots.

*Q.* 2.—What is the best sort of leguminous plant to use for manuring an orange orchard (a non-runner)?

*A.* Nearly all the best leguminous cover crops are runners and are preferred for this reason, as they keep the ground well covered. The place under the trees should always be kept free from crop and eventually be mulched with some of the cut down green crop. Mauritius beans are one of the best cover crops for the North. Upright growing cowpeas might be tried as well as the Mauritius beans.

*Q.* 3.—Is the Pigeon Pea a legume, and does it enrich or impoverish the land?

*A.* Pigeon Pea is a legume and enriches the soil, but it is liable to grow too salt and rank. It is more suitable for land lying fallow.

*Q.* 4.—With legumes what is the difference in manure value between a crop ploughed in while growing and the same crop left to seed and then ploughed in after the seed has been gathered and the plant is dead and dry?

*A.* The best time to plough green crops under is at time of seeding, but good results are obtained even after seeds are allowed to ripen as the ground is covered with dead leaves and vines.

## HEAVIEST COB OF MAIZE.

E. A. Hoffmann, Guluguba.—

We have obtained the weight of a single cob of maize. Thoroughly dried it turned the scale at a little over 14 oz. This was not, however, a competition cob. Twelve such ears would, of course, weigh 10½ lb.

## PRICKLY-PEAR ASH.

J. S., Inglewood—

There is no market for crude prickly-pear ash, as this has to be manufactured into sulphate before it can be used as a fertiliser. The best way would be to prepare a sample of such ash and send it to a wholesale chemist, such as Elliott Bros., or Taylor and Colledge, of this city, for valuation.

## SPLIT PEAS.

J. F. Keane, Carbeen—

For split peas, choose those eld peas which produce small pods and peas, which divide into halves easily, and of which the skin of the pea is loose. It will be found that, in threshing such kinds, the seeds split into halves, and that, in winnowing, the skins are blown off, leaving the article ready for market.

## SEX OF PAPAW TREES.

A. H. F., Diddillibah—

Mr. C. Ross, F.R.H.S., Instructor in Fruit Culture, says:—"There is no way of telling the male from the female papaw whilst the plants are young. The safest way to insure having all female trees is to graft all seedlings, male and female alike, when from one-quarter to one inch in thickness. If the cleft graft is performed, very few misses will occur."

## POISONING TREES WITH ARSENIC AND SODA.

Many complaints have been received as to the want of effectiveness in ring-barking. This seems to be principally due to the fact that trees are ring-barked or sapped in the wrong season of the year.

Some varieties of trees, notably the round-leaf box, sucker and throw up shoots from surface roots if the trees are not dealt with when the sap is up, *i.e.*, when they are in full growth. April and May are probably the most suitable months for ring-barking.

The arsenical mixture used for killing trees is made up in the following proportions:—2 lb. arsenic to 1 lb. caustic soda to 2 gallons of water. This is a very concentrated solution and care must be taken to keep all utensils containing same away from stock. Animals should not be allowed access to portions of a paddock dealt with in this way for some weeks afterwards.

The easiest method for distributing the arsenical solution is to fit a tap into a kerosene tin and attach a 2 ft. length of rubber hose to the tap; solder D's to the sides and bottom of the kerosene tin, so that straps can be used to carry it about; a screw-top or other water-tight lid is necessary.

When preparing arsenical solutions the ingredients should be dissolved by boiling for about an hour; the fumes should not be inhaled.

Although there is probably more danger to stock where plants like prickly-pear have been "sprayed" with a poisonous compound, the advice given in previous part of letter is to be regarded as precautionary.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR APRIL, 1915.

| Article. | | APRIL. Prices. |
|---|---|---|
| Bacon | lb. | 11½d. |
| Bran (Mill price) | ton | £10 |
| Butter | cwt. | 142s. |
| Chaff, Mixed | ton | £7 10s. to £8 |
| Chaff, Oaten | „ | £10 to £12 |
| Chaff, Lucerne | „ | £8 |
| Chaff, Wheaten | „ | £4 5s. to £5 |
| Cheese | lb. | 8¾d. to 9d. |
| Flour | ton | ... |
| Hams | lb. | 1s. 2d. |
| Hay, Oaten | ton | £13 10s. |
| Hay, Lucerne (Prime) | „ | £7 to £7 10s. |
| Honey | lb. | 3d. to 3½d. |
| Maize | bush. | 5s. 8d. |
| Oats | „ | 6s. |
| Onions | ton | £8 10s. |
| Peanuts | lb. | 2¾d. to 4d. |
| Pollard (Mill price) | ton | £12 |
| Potatoes | „ | £9 to £10 |
| Potatoes (Sweet) | cwt. | 4s. 6d. |
| Pumpkins | ton | £6 5s. |
| Eggs | doz. | 1s. 5d. to 2s. 1d. |
| Fowls | pair | 3s. 6d. to 4s. 6d. |
| Ducks, English | „ | 3s. 3d. |
| Ducks, Muscovy | „ | 4s. 3d. |
| Turkeys (Hens) | „ | 6s. to 7s. |
| Turkeys (Gobblers) | „ | 9s. to 11s. |
| Wheat (Seed) | bush. | 9s. |

## SOUTHERN FRUIT MARKETS.

| Article. | APRIL. Prices. |
|---|---|
| Bananas (Queensland), per case | 8s. to 12s. |
| Bananas (Fiji), per case | 22s. 6d. to 23s. 6d. |
| Bananas (G.M.), per case | ... |
| Mangoes, per case | ... |
| Oranges (Navel), per case | ... |
| Oranges, Italian, per case | ... |
| Oranges (Other), per case | ... |
| Passion Fruit, per half-bushel case | 1s. 6d. to 3s. |
| Papaw Apples, per half-case | ... |
| Pineapples (Queens), per case | 6s. to 7s. |
| Pineapples (Ripleys), per case | 3s. 6d. to 6s. |
| Pineapples (Common), per case | 3s. to 5s. |
| Tomatoes, per quarter-case | 3s. 6d. to 5s. 6d. |
| Persimmons, per half-case | ... |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | APRIL. Prices. |
|---|---|
| Apples (American), Eating, per case | 8s. to 9s. |
| Apples (Local), per case | 5s. to 7s. |
| Apples, Cooking, per case | 8s. to 9s. |
| Bananas (Cavendish), per dozen | 1½d. to 4½d. |
| Bananas (Sugar), per dozen | 1½d. to 4½d. |
| Cocoanuts, per sack | 12s. to 15s. |
| Custard Apples, per quarter-case | 4s. to 6s. |
| Lemons (Local), per case | 3s. to 5s. |
| Lemons (Italian), per case | 9s. to 10s. |
| Mandarins (Northern), per case | 7s. to 8s. |
| Oranges (other), per case | 3s. to 6s. 6d. |
| Passion Fruit, per case | 4s. to 8s. 6d. |
| Peanuts, per pound | 2¾d. to 4d. |
| Pears (Victorian), per case | 10s. to 11s. |
| Persimmons, per quarter-case | 3s. 6d. to 4s. |
| Pineapples (Ripley), per dozen | 3s. to 5s. |
| Pineapples (Smooth), per dozen | 2s. to 4s. 6d. |
| Rosellas, per sugar bag | 2s. to 4s. |
| Tomatoes, per quarter-case | 3s. 6d. to 7s 6d. |

### VEGETABLES.

| | | |
|---|---|---|
| Cabbages | per dozen | 4s. to 10s. |
| Peas | per sugar bag | 7s. to 10s. 6d. |
| Beans | „ „ | 5s. 6d. to 9s. |
| Parsnips | per dozen bunches | 6d. to 1s. 3d. |
| Carrots | „ „ | 1s. 6d. to 1s. 9d. |
| Cucumbers | per dozen | 6d. to 1s. 9d. |
| Custard Marrows | „ | 2s. 6d. to 5s. |
| Vegetable Marrows | „ | 3s. to 5s. 6d. |
| Chocos | per quarter-case | 2s. to 2s. 6d. |
| Table Pumpkins | per dozen | 3s. to 3s. 6d. |
| Tomatoes | per quarter-case | 3s. 6d. to 7s. 6d. |

## TOP PRICES, ENOGGERA YARDS, MARCH, 1915.

| Animal. | MARCH. Prices. |
|---|---|
| Bullocks | £14 15s. to £18 |
| Cows | £10 12s. 6d. to £12 7s. 6d. |
| Merino Wethers | 22s. 3d. |
| Crossbred Wethers | 24s. |
| Merino Ewes | 19s. 9d. |
| Crossbred Ewes | 22s. |
| Lambs | 17s. 6d. |
| Pigs (Porkers) | 46s. |

# TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

COMPUTED BY D. EGLINTON, F.R.A.S.

| Date. | MAY. | | JUNE. | | JULY. | | AUGUST. | |
|---|---|---|---|---|---|---|---|---|
| | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·14 | 5·17 | 6·31 | 5·0 | 6·39 | 5·3 | 6·30 | 5·18 |
| 2 | 6·14 | 5·16 | 6·31 | 5·0 | 6·39 | 5·3 | 6·30 | 5·18 |
| 3 | 6·15 | 5·15 | 6·32 | 5·0 | 6·39 | 5·3 | 6·29 | 5·19 |
| 4 | 6·15 | 5·14 | 6·32 | 5·0 | 6·40 | 5·4 | 6·28 | 5·20 |
| 5 | 6·16 | 5·13 | 6·33 | 4·59 | 6·40 | 5·4 | 6·27 | 5·21 |
| 6 | 6·17 | 5·12 | 6·33 | 4·59 | 6·40 | 5·4 | 6·27 | 5·21 |
| 7 | 6·17 | 5·12 | 6·34 | 4·59 | 6·40 | 5·5 | 6·26 | 5·21 |
| 8 | 6·18 | 5·11 | 6·34 | 4·59 | 6·40 | 5·5 | 6·25 | 5·22 |
| 9 | 6·18 | 5·11 | 6·34 | 4·59 | 6·40 | 5·5 | 6·24 | 5·22 |
| 10 | 6·19 | 5·10 | 6·35 | 4·59 | 6·40 | 5·6 | 6·24 | 5·22 |
| 11 | 6·19 | 5·10 | 6·35 | 4·59 | 6·39 | 5·6 | 6·23 | 5·23 |
| 12 | 6·20 | 5·9 | 6·35 | 4·59 | 6·39 | 5·6 | 6·23 | 5·23 |
| 13 | 6·20 | 5·9 | 6·35 | 4·59 | 6·39 | 5·7 | 6·22 | 5·24 |
| 14 | 6·20 | 5·8 | 6·36 | 4·59 | 6·39 | 5·7 | 6·21 | 5·25 |
| 15 | 6·21 | 5·8 | 6·36 | 5·0 | 38 | 5·8 | 6·20 | 5·26 |
| 16 | 6·21 | 5·7 | 6·36 | 5·0 | 6·38 | 5·8 | 6·19 | 5·26 |
| 17 | 6·22 | 5·6 | 6·37 | 5·0 | 6·38 | 5·9 | 6·18 | 5·26 |
| 18 | 6·22 | 5·5 | 6·37 | 5·0 | 6·37 | 5·10 | 6·17 | 5·27 |
| 19 | 6·23 | 5·5 | 6·37 | 5·0 | 6·37 | 5·11 | 6·16 | 5·27 |
| 20 | 6·23 | 5·4 | 6·38 | 5·0 | 6·36 | 5·12 | 6·15 | 5·27 |
| 21 | 6·24 | 5·4 | 6·38 | 5·0 | 6·36 | 5·12 | 6·14 | 5·28 |
| 22 | 6·24 | 5·4 | 6·38 | 5·0 | 6·36 | 5·12 | 6·13 | 5·28 |
| 23 | 6·25 | 5·3 | 6·38 | 5·0 | 6·35 | 5·13 | 6·12 | 5·29 |
| 24 | 6·25 | 5·3 | 6·38 | 5·1 | 6·35 | 5·13 | 6·11 | 5·29 |
| 25 | 6·26 | 5·3 | 6·39 | 5·1 | 6·35 | 5·13 | 6·10 | 5·30 |
| 26 | 6·26 | 5·2 | 6·39 | 5·1 | 6·34 | 5·14 | 6·9 | 5·30 |
| 27 | 6·27 | 5·2 | 6·39 | 5·2 | 6·34 | 5·14 | 6·8 | 5·31 |
| 28 | 6·28 | 5·2 | 6·39 | 5·2 | 6·33 | 5·15 | 6·7 | 5·31 |
| 29 | 6·29 | 5·1 | 6·39 | 5·2 | 6·32 | 5·16 | 6·6 | 5·32 |
| 30 | 6·30 | 5·1 | 6·39 | 5·3 | 6·31 | 5·17 | 6·5 | 5·32 |
| 31 | 6·30 | 5·1 | ... | ... | 6·31 | 5·17 | 6·5 | 5·33 |

## PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 6 May | ☽ | Last Quarter | 3 | 22 | p.m. |
| 14 „ | ● | New Moon | 1 | 31 | „ |
| 22 „ | ☾ | First Quarter | 2 | 50 | „ |
| 29 „ | ○ | Full Moon | 7 | 33 | a.m. |

The moon will be at its brightest not only when full, but because it will this month be at its least distance from the earth at that time.

| | | | | | |
|---|---|---|---|---|---|
| 5 June | ☽ | Last Quarter | 2 | 32 | a.m. |
| 13 „ | ● | New Moon | 4 | 57 | „ |
| 21 „ | ☾ | First Quarter | 12 | 24 | „ |
| 27 „ | ○ | Full Moon | 2 | 27 | p.m. |

The moon will be at its greatest distance from the earth on 11th June at 10 a.m., and nearest on the 26th at midday.

| | | | | | |
|---|---|---|---|---|---|
| 4 July | ☽ | Last Quarter | 3 | 54 | p.m. |
| 12 „ | ● | New Moon | 7 | 30 | „ |
| 20 „ | ☾ | First Quarter | 7 | 9 | a.m. |
| 26 „ | ○ | Full Moon | 10 | 11 | p.m. |

The moon will be at its greatest distance from the earth on 8th July, about 9 p.m., and at its nearest on the 24th at 3·24 p.m.

| | | | | | |
|---|---|---|---|---|---|
| 3 Aug. | ☽ | Last Quarter | 7 | 27 | a.m. |
| 11 „ | ● | New Moon | 8 | 52 | „ |
| 18 „ | ☾ | First Quarter | 12 | 17 | p.m. |
| 25 „ | ○ | Full Moon | 7 | 40 | a.m. |

The moon will be at its greatest distance from the earth on 5th August at 36 minutes after 12, midday, and at its nearest on the 20th about midnight.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes, respectively, later than at Brisbane.

At Roma the times of sunrise and sunset during May, June, July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given for Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

[All the particulars given on this page were computed by D. Eglinton, F.R.A.S., and should not be reproduced in local newspapers without acknowledgment.]

# Farm and Garden Notes for June.

Field.—Winter begins on the 24th of this month, and frosts will already have been experienced in some of the more exposed districts of the Southern coast and on the Darling Downs. Hence, insect pests will, to a great extent, cease from troubling, and weeds will also be no serious drawback to cultivation. The month of June is considered by the most successful lucerne-growers to be the best time to lay down this crop, as any weeds which may spring up in the event of a dropping season will be so slow-growing that the young lucerne plants will not be choked by them.

The land should now be got ready for millets, sorghums, panicum, &c. Oats, barley, vetches, clover, tobacco, buckwheat, field carrots, and Swedes may now be sown. Some advocate the sowing of early maize and potatoes during this month, but, obviously, this can only apply to the more tropical parts of Queensland. The land may be got ready, but in the Southern districts and on the tableland neither maize nor potatoes should be planted before August, or at the earliest, in warm, early districts, at the end of July. There is always almost a certainty of frosts, more or less severe, during these months. Arrowroot will be nearly ready for digging, but we would not advise taking up the bulbs until the frosts of July have occurred. Take up sweet potatoes, yams, and ginger. Should there be a heavy crop, and consequently a glut in the market, sweet potatoes may be kept by storing them in a cool place in dry sand, taking care that they are thoroughly ripe before digging. The ripeness may be known by the milky juice of a broken tuber remaining white when dry. Should the juice turn dark, the potato is unripe, and will rot or dry up and shrivel in the sand pit. Before pitting, spread the tubers out in a dry barn or in the open, if the weather be fine. In pitting them or storing them in hills lay them on a thick layer of sand, then pour dry sand over them till all the crevices are filled and a layer of sand is formed above them. Then put down another layer of tubers, and repeat the process until the hill is of the requisite size. The sand excludes the air, and the potatoes will keep right through the winter. Late wheat may still be sown, but it is too late for a field crop of onions. In tropical Queensland the bulk of the coffee crop should be off by the end of July. Yams may be unearthed. Cuttings of cinnamon and kola nut tree may be made, the cuttings being planted under bell glasses. Collect divi-divi pods and tobacco leaves. English potatoes may be planted. The opium poppy will not be blooming and forming capsules. Gather tilseed (sesame), and plant out young tobacco plants if the weather be suitable. Sugar-cane cutting may be commenced. Keep the cultivator moving amongst the pineapples. Gather all ripe bananas.

In our Farm and Garden Notes for May, published in the April issue of the Journal, it was inadvertently stated that Messrs. Kitchen

and Sons and Messrs. Joyce Bros. were purchasers of seed cotton. These firms, we understand, are not at present cotton buyers. The Department of Agriculture and Stock are still buyers of this product.

KITCHEN GARDEN.—Cabbage, cauliflower, and lettuce may be planted out as they become large enough. Plant asparagus and rhubarb in well-prepared beds in rows. In planting rhubarb it will probably be found more profitable to buy the crowns than to grow them from seed, and the same remark applies to asparagus.

Sow cabbage, red cabbage, peas, lettuce, broad beans, carrots, radish, turnip, beet, leeks, and herbs of various kinds, such as sage, thyme, mint, &c. Eschalots, if ready, may be transplanted, also horse-radish can be set out now.

The earlier sowings of all root crops should now be ready to thin out, if this has not been already attended to.

Keep down the weeds amongst the growing crops by a free use of the hoe and cultivator.

The weather is generally dry at this time of the year, so the more thorough the cultivation the better for the crops.

Land for early potatoes should now be got ready by well digging or ploughing.

Tomatoes intended to be planted out when the weather gets warmer may be sown towards the end of the month in a frame where the young plants will be protected from frost.

FLOWER GARDEN.—No time is now to be lost, for many kinds of plants need to be planted out early to have the opportunity of rooting and gathering strength in the cool moist spring time to prepare them for the trial of heat they must endure later on. Do not put your labour on poor soil. Raise only the best varieties of plants in the garden; it costs no more to raise good varieties than poor ones. Prune closely all the hybrid perpetual roses, and tie up, without pruning, to trellis or stakes, the climbing and tea-scented varieties, if not already done. These and other shrubs may still be planted. See where a new tree or shrub can be planted; get these in position; then they will give you abundance of spring bloom. Renovate and make lawns, and plant all kinds of edging. Finish all pruning. Divide the roots of chrysanthemums, perennial phlox, and all other hardy clumps; and cuttings of all the summer bedding plants may be propagated.

Sow a first lot, in small quantities, of hardy and half-hardy annuals, biennials, and perennials, some of which are better raised in boxes and transplanted into the open ground, but many of this class can, however, be successfully raised in the open if the weather is favourable. Antirrhinum, carnation, picotees, dianthus, hollyhock, larkspur, pansy, petunia, *Phlox Drummondii*, stocks, wallflower, and zinnias, &c., may be sown either in boxes or open beds; mignonette is best sown where it is intended to remain.

To grow these plants successfully, it is only necessary to thoroughly dig the ground over to a depth of not less than 12 in., and incorporate

with it a good dressing of well-decayed manure, which is most effectively done by a second digging; the surface should then be raked over smoothly, so as to remove all stones and clods, thus reducing it to a fine tilth. The seed can then be sown in lines or patches as desired, the greatest care being taken not to cover deeply; a covering of not more than three times the diameter of larger seeds, and a light sprinkling of fine soil over small seeds, being all that is necessary. A slight mulching of well-decayed manure and a watering with a fine-rosed can will complete the operation. If the weather prove favourable, the young seedlings will usually make their appearance in a week or ten days, thin out so as to leave each plant (if in the border) at least 4 to 6 in. apart.

# Orchard Notes for June.

## THE SOUTHERN COAST DISTRICTS.

The Notes of last month, referring to the care to be taken in the handling and marketing of all kinds of citrus fruits, apply with equal force during this and subsequent months till the end of the season.

Keep the orchard clean, and work the land to retain moisture. The handling of the citrus crop is the main work in many orchards, but where slowly acting manures are to be given their application should not be later than this month. They should be well mixed with the soil, so that when the Spring comes and the trees start a fresh growth a certain percentage of plant food will be available for the trees' use. Heavy pruning should be done now, whilst the trees are dormant. All large limbs should be cut off close to the main stem; the edges of the cuts should be carefully trimmed, and the whole wound, if of large size, covered with paint or grafting wax, so that it will not start to decay, but soon grow over. When the soil of the orchard is becoming deficient in organic matter, the growing of a winter green crop, such as mustard or rape, is well worth a trial. Clear the crop of fruit from the part of the orchard to be so treated. Plough the land well; work the soil down fine so as to get a good seed bed, and broadcast the mustard or rape. A manuring of 4 cwt. of meatworks manure and 1 cwt. of sulphate of potash per acre will produce a very heavy crop of green manure, and the plant food not required for the production of such crop will be still available for the trees' use in Spring.

Pineapples and bananas should all be cleaned up, and the land got into first-class order. Pineapples, where at all liable to frost, should be covered with grass or other suitable material. The growth of weeds between the rows of pines on land liable to frost is one of the best ways of encouraging frost, as frost will strike dirty, weedy ground, and injure the pines growing thereon severely, when it will do little, if any, damage where the land is kept perfectly clean—another advantage of cleanliness in cultivation.

## THE TROPICAL COAST DISTRICTS.

Keep the land well cultivated—plough when necessary to bury weed growth, and get the surface of the ground into a state of thorough tilth, as moisture must be retained in the soil by cultivation to mature the spring crop of fruit. This applies not only to oranges and other tree fruits, but to bananas and pines as well. A good start in spring means good bunches of bananas and early ripening pineapples. Heavy pruning can be done now in the case of all trees not carrying a heavy crop of fruit, but where citrus trees are heavily loaded, the pruning should be put off till after the spring crop of fruit has been gathered. The spraying of the trunks and inside of the trees with the lime and sulphur wash can be carried out, and where Maori is making its appearance the sulphide of soda wash should be used as well.

## THE SOUTHERN AND CENTRAL TABLELANDS.

The pruning of all kinds of deciduous fruit trees is the chief work of the month in the Stanthorpe district. Do not be frightened to prune severely, first, in the case of young trees, so as to get strong well-grown trees instead of straggling top-heavy trees; and, second, in the case of trees that are going off in the size and quality of their fruit. Where peaches, apricots, plums, or nectarines are only making very little new growth, and that weak, so that the fruit produced thereon is small, it is advisable to head the tree hard back, so that it will throw out some vigorous branches in Spring that will form a new head for the tree. Apples, as well as plums and apricots, are sometimes inclined to overproduce fruit spurs, which become long and straggling, and bear a large quantity of small-size fruit. A vigorous shortening back and cutting out of such spurs will have a very beneficial effect in the quality and size of the fruit produced.

Gather and burn all prunings; and, where codlin moth is present in the orchard, examine the tree carefully when pruning it, so as to see if there are any cracks, crevices, or masses of loose bark in or under which the larvæ of the moth may be hibernating. All larvæ so found should be destroyed, and if the work is carried out systematically it will tend to materially decrease the crop of moths that will hatch out the following spring.

As soon as any part of the orchard is pruned, gather up the prunings, and work the land, as a thorough winter weathering of the soil is very beneficial in its effects: and, further, it will tend to destroy many insects that may be wintering in it. The planting of new orchards or of trees to replace any that may have died, or that have been proved to be unsuitable to the district, may be continued during the month, and right on till the end of winter.

Do not prune vines in the Stanthorpe district, as it is advisable to leave the pruning as late as possible, but vine pruning can be done at any time now in the Roma or Central districts. Tree pruning can be continued during the month, and the orchard should be kept well worked. Citrus fruits can be marketed. Lemons should be gathered and cured.

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# Agriculture.

## SISAL HEMP.

Since the year 1897, when this Journal came into existence, we have advocated the cultivation of sisal hemp. We have repeatedly pointed out that waste lands (dry and rocky), useless for any other marketable vegetable product, could be utilised for the production of a crop which, although, as we shall show, subject to fluctuations in price, yet, under the most adverse climatic conditions of drought, when all other crops suffer and yield not only no profit but prove an absolute loss to the farmer, is able to hold its own and give substantial returns to the grower.

The principal source of this fibre has, for a long series of years, been Mexico, and of later years East Africa. Now, however, that both these countries are handicapped as to their agricultural products, especially Mexico, the urgent demand for sisal hemp cannot be complied with. Had the farmers of Queensland utilised some of their waste lands by planting sisal hemp, which after the first or second year requires no attention, they would to-day be reaping a highly profitable harvest. We have, in previous articles, shown how a clear profit of £12 per acre has been made in a few districts in the State. The profits are, of course, regulated by supply and demand, and on several occasions the demand has so far exceeded the supply that prices have risen by over 100 per cent.

For instance, to-day fair seconds hemp is quoted at £37 per ton. A crop of sisal four or five years old will amount to 1 ton, and even more, of fibre per acre, and the cost of production, as shown by a grower at Childers, is about £12 per ton. Only twice since 1879 has the price

of sisal fibre exceeded this figure. That was in 1889 and 1902, when the price rose to £50 per ton. In 1888, and again in 1903-4-5-6 and '7, fair seconds brought £37 per ton. The lowest prices were in 1893, £17; 1894, £15; 1895, £18; 1896, £19; and 1897, £17 per ton. Then in 1897 the price suddenly rose to £27 per ton; in 1898 the price was £33; in 1900, £37; and in 1902, £50 per ton; in 1908 it fell to £25, and in 1909 it was steady at £27. To-day (1st May) it is impossible to say what the value may be. Even Furcrea (Mauritius hemp) is worth £34 per ton. Messrs. Landauer and Co., London, in their trade circular on the fibre market (17th March), write as follows:—

"What would happen in this market if any heavy demand set in, in view of the critical position of Mexican sisal hemp, is best left to the imagination. We estimate sales for the week at 10/12,000 bales, which includes a very fair percentage of business done with consumers. Closing values are £28 10s. to £28 15s. for good seconds, £36 10s. to £37 for fair current, February/April and March/May shipment.

"Spot hemp has been in heavy demand, but very little offering, and the value has advanced to the basis of £29 for good seconds.

"*Mexican Sisal Hemp.*—American twine manufacturers have suffered a great surprise, and view with considerable alarm the prospect of being deprived of their supplies, so urgently needed for the manufacture of binder twine for the approaching season. The port of Progreso has suddenly been closed, and all communications, both by mail and cable, suspended. It is impossible to over-estimate the seriousness of the position for American twine producers, seeing that they annually consume fully seven-eighths of the total supply of Mexican sisal hemp, in addition to having taken for some years past the bulk of the production of kindred articles such as Java, East African, and Bahama sisal, supplies of which are now also cut off. The position is a most critical one when it is reflected that the total production and consumption of the various descriptions of sisal hemp are approximately double in weight the production of Manila hemp. With these various factors to face, no one can predict what may be in store for the fibre markets in the near future. It seems fairly certain that the value of all hemps that are available will be greatly enhanced, and when the heavy demand (which seems inevitable) sets in we may easily experience a ' panicy ' market. It is to be hoped that the Government of the United States will succeed in getting the port of Progreso reopened; otherwise it is difficult to see where the raw material is to come from which is necessary for the manufacture of binder twine for the approaching harvest, and the critical nature of the position becomes more pronounced when one appreciates the extreme difficulty experienced by Manila shippers to secure freight, and in addition the fact that the approaching new system of grading in the Philippines adds to the troubles of shippers in trading to any large extent."

**Department of Agriculture and Stock, Queensland.**

# SEEDS FOR SALE.

## SEED MAIZE.

The Department of Agriculture and Stock has a limited quantity of the following varieties for sale at 8s. per bushel, f.o.b. Brisbane.

Remittance to accompany order.

The quantity of seed grain which will be supplied to any individual applicant will not exceed three bushels, and orders will be attended to according to priority of application.

In the event of orders exceeding the available supply of any one variety, the right of substituting another is reserved.

The seed offered has its origin from grain imported from U.S. America:—

| | |
|---|---|
| Golden Beauty | Hildreth |
| Hiawatha Yellow Dent | Pride of the North |
| Reid's Yellow Dent | Boone County White |

## SORGHUMS AND MILLETS.

The Department of Agriculture and Stock has a limited quantity of the following varieties for sale at 4d. per lb., f.o.b. Brisbane.

Remittance to accompany order. In the event of having to forward by parcel post, the cost of same should be included with remittance.

The quantity of seed grain to be supplied to any individual applicant will not exceed 10 lb., and orders will be attended to according to priority of application.

In the event of orders exceeding the available supply of any one variety, the right of substituting another is reserved; if this arrangement is not acceptable, notification to this effect should be made when ordering.

The seed offered has its origin from grain imported from U.S. America, the varieties having been introduced there from different parts of the globe.

The non-saccharine sorghums came here with a reputation for drought resistance:—

| | |
|---|---|
| Oklahoma Dwarf Broom Millet | Black-hulled Kaffir Corn (non-saccharine) |
| Improved Evergreen Millet | Valley Kaoliang (non-saccharine) |
| Dwarf Milo (non-saccharine) | Soudan Dhoura (non-saccharine) |
| Shantung Dwarf Kaoliang (non-saccharine) | Planters' Friend (saccharine) |
| Cream Milo (non-saccharine) | Early Amber Cane (saccharine) |
| Standard Milo (non-saccharine) | Sorghum Saccharatum (saccharine) |

# Pastoral.

## JUDGING A BULLOCK'S WEIGHT.

Messrs. Armour and Co., Chicago, who have brought the science of cattle-buying to a fine point, publish in "Armco," their house magazine, their buyers' methods for judging the weight of cattle:—

"To the experienced buyer there are quite a number of ways to make certain of the beef-yielding qualities of any bullock or steer.

"These points stand out boldly before the eye of a man who is constantly in the game for many years, and who trains himself to look for and see them. Among the first points an expert buyer looks for are a fat wattle under an animal's jaw and width across the shoulders. The shoulders should be thick and square clear up to the neck, so that there will be a good yield of beef all the way along. If a bullock is broad along the back, but sharp at the neck, there is want of beef there.

"Another way to judge a bullock is from a point several feet straight behind him. Notice the conformation of his hips and back. If he has been thoroughly fed, his 'pants' will be tight, and he will be straight and flat across the buttock. If not, he will be divided and have the appearance of being split all the way up, which indicates a lack of meat between the legs or in the rounds.

"Again, get him into action, and when he stops notice whether he pushes a good flank. If he does, this indicates that a good yield of beef can be expected from him."—"New Zealand Farmer."

## LIBERATING POTASH.

While the supply of potash manures from Germany has been stopped by the war, and a good many users of kainit and sulphate of potash will now have to do without these fertilisers, it is well to remember that there is a natural supply of potash in the ground which may be locked up. While they could get constant supplies of potash many farmers were content to keep adding, but the time has come to look for the magic key which unlocks the door, liberates the potash, and makes it available for crops. Our forefathers used this key for the same purpose, but perhaps without quite knowing why, years before the potash mines in Germany were opened up, and the key was a dressing of lime. If we return to it again, and this valuable essential to fertility is applied to land requiring it, the door will be unlocked and Nature's reserve of potash be liberated in a form that crops can avail themselves of it. If this hint be taken, and we utilise other sources of potash that are available, we shall carry through until potassic salts are again available.—"Garden and Field."

# The Horse.

## THE HIGHLAND PONY.

By P. R. GORDON.

Although the extensive adoption of mechanical traction will not bring about a serious decrease in the demand for horses, it will, to a considerable extent, limit the demand for heavy and light draught horses for road traffic. Its effects are seen in cities where the motor-car has completely superseded the stylish carriages and pairs, and to a large and constantly increasing extent the buggy, the van, and even the lorry horse. Even in the far West, station managers have abandoned the favourite hack for the motor-car on station work. While this change is developing, however, there is an ever-increasing use found for the pony, and among the various native breeds of ponies the Highland pony holds a high position. I am indebted to a friend, a fellow-countryman, for much valuable information about the Highland pony, his experience of the breed dating many years subsequent to the date of my leaving Scotland.

There have always been small horses in Britain—at all events, in Scotland. The remains found recently in the Roman camp at Newstead include horse bones which indicate that the native horses were from 11 to 13 hands in height. It is impossible to disregard the limiting influence of local conditions, which prescribe to each district, at each period of its development, the size and type of horse which can be maintained within it. Therefore, the original Highland pony is not a horse reduced in size by the scarcity of herbage; but the horse whose type and qualities favoured its survival in those conditions which prohibited any increase in size. These same conditions fixed other characteristics as well. They prescribed and produced a degree of vigour and robustness fitted for its maintenance of life in adversity and for its performance of feats of labour and endurance that would otherwise be impossible for so small a frame. The original Highland pony—small, robust, gay, shaggy, alert, strong-boned, short-eared, large-eyed—is the product of natural conditions and human needs in the Highlands. It is a definite race established by long selection, having characteristics indelibly fixed. It has already been said that within this variety of race there remains real and very considerable variety of type—a variety hardly less great than that which we find between larger breeds of horses; and the fact that the various types do not breed true, but are interchangeable, points to a far back mixture of races. Yet in its widely varying development the pony remains a fixed breed. Highland ponies may be divided into three classes. First: The representatives of the original pony of Baria and the outer islands, in height from 12·2 to 13·3. They have good hard legs and feet; their heads are rather large and plain, and their shoulders rather straight, but they are hardy little

animals, well suited to stand exposure and poor feeding, and when brought on to good keep it is wonderful how they improve in width and rotundity. Second: The high-class riding pony of the West Highlands, in height 13·2 to 14·2. They belong to Mull, Tirèe, Skye, and Uist, and show a very strong cross of Arab blood, believed to have come with the Spanish Armada horses or Arab chargers brought home by Highland officers. These ponies have beautiful heads and good shoulders; are good all over, and are famous for staying through long journeys under heavy weights and on poor keep. Third: The Highland garron, belonging chiefly to Perthshire and the central Highlands. They have good

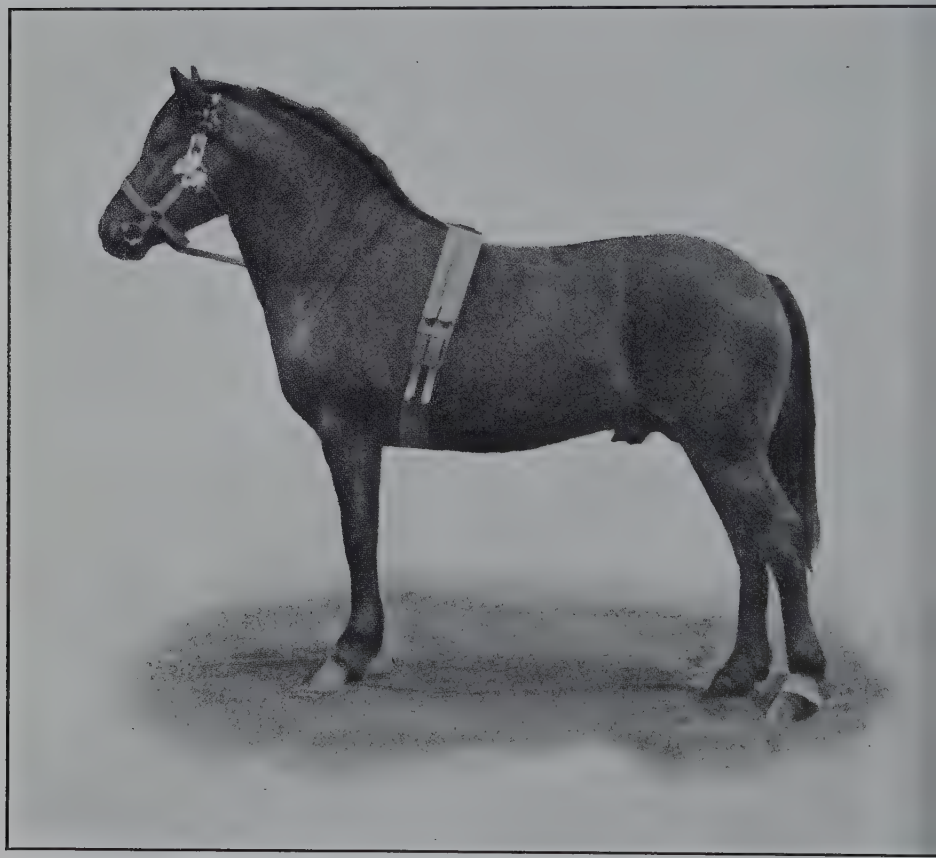

PLATE 24.—HIGHLAND PONY, MOUNTAINEER, 3 years old, first in the Heavy Stallion Class, and winner of the President's Medal as best Highland Pony at the Highland and Agricultural Society's Show, Hawick, 1914.

game heads, bold eyes, shoulder a little too straight, and back long, with the best of legs and feet; a good tuft of hair on the heels, and a well-set-on tail. They are short but strong in the pastern, with a very short distance between knee and fetlock. They have short ears, good eyes, sagacious-looking heads with great strength of jaw and big, wide, open, clean-cut nostrils. There is no trace of Arab blood in their origin. They are up to 15 hands, and are the biggest and most substantially built pure-bred ponies in Scotland—the majority of them strong enough

to pull with ease a ton load on a macadamised road. They are unequalled hill ponies for staying power, sure-footed, and for carrying heavy loads of deer and taking the sportsmen to the shooting ground. They possess the strength of the cart-horse with the nuggety built steep powerful shoulders and low withers of the best normal type of pony.

The Highland pony has much to commend it to Australia for the production of military horses, which will be a profitable pursuit for many years to come; its reputation for such purposes has already been recognised. The Boer war so well established its fame as the *beau ideal* of a hard military horse, leaving a most enviable record as to their hardiness and utility. One has only to read of the feats of Lovat's scouts in the South African campaign to understand the estimation in which they are held and the strong demand that has sprung up in the United States and the Argentine for Highland sires to cross on thoroughbred mares. If this were applied to Australia, where our light horses are on the "racy" side, an important industry would at once spring up, and a perfect type of military horse would be evolved that would bring wealth to our country.

Since the above was written, an article has appeared in the Press in which the writer states that the present war has shown that the skin of the English thoroughbred horse is too thin and delicate to stand the rough usage and riding of a battlefield, resulting in back and girth galls, while the French war horse, which is strongly impregnated with the blood of the Percheron, having a less sensitive skin, is faulty both in limbs and feet; and the writer fully concurs with the oft-expressed opinion that the best type of a battlefield horse is a Highland pony sire crossed on a thoroughbred mare.

## WORMS IN HORSES.

The first symptoms of worms are a staring coat, tucked-up flanks, loss of condition, and usually a ravenous appetite. When those symptoms are noticed, the animal should be given 2 oz. of turpentine and 1 pint of raw linseed oil on an empty stomach, followed daily with the following powder in dry food:—Sulphate of iron, 4 drs.; tartar emetic, 1 dr.

## ANOTHER SOURCE OF POTASH.

The "Board of Trade Journal" for 14th January, 1915, states that the most promising American source of potash is found to be the annual crop of giant kelp on the Pacific coast. The area of the commercially available beds aggregates nearly 400 square miles, capable of yielding annually, either as dried kelp or as potassium chloride, over six times the present consumption of soluble potash salts in the United States, or something more than the world's present production. The development of a great potash-producing industry in the United States seems now to be a matter of time only.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, APRIL, 1915.

The twelfth egg-laying competition held here commenced on 1st April, with 53 competing pens, made up as follows:—40 pens White Leghorns, 7 Black Orpingtons, 2 S.L. Wyandottes, 2 Rhode Island Reds, and 1 each Barred Plymouth Rocks and Brown Leghorns. The pens of the following owners are suffering from warts:—J. H. Gill, Cowan Brothers (White Leghorns), and W. Lindus; while a few birds in various pens have broken into moult. The birds must have brought the warts with them, as none of the College stock had been affected, and we took the precaution to thoroughly disinfect all the houses before putting in the new competitors. Mrs. Jobling's Black Orpingtons (?) win the monthly prize with 123 eggs. The following are the individual records:—

| Competitors. | Breed. | April. |
|---|---|---|
| Mrs. J. Jobling, Plattsburg, N.S.W. ... ... | White Leghorns (?) ... | 123 |
| Jas. McKay, Gatton ... ... ... ... | Do. ... ... | 122 |
| S. E. Sharpe, Childers ... ... ... ... | Do. ... ... | 120 |
| C. B. Bertelsmaier, Clare, S.A. ... ... ... | Do. ... ... | 117 |
| J. D. Nicholson, Flora st, Arncliffe, N.S.W. ... | Do. ... ... | 102 |
| W. Parker, Sunnybank ... ... ... ... | Do. ... ... | 100 |
| T. Fanning, Ashgrove, Brisbane ... ... ... | Do. ... ... | 97 |
| O.K. Poultry Yards, Fredericks st., Toowoomba | Do. ... ... | 95 |
| A. T. Coomber, Brown's Estate, Bundaberg ... | Do. ... ... | 87 |
| J. R. Wilson, Eudlo ... ... ... ... ... | Do. ... ... | 85 |
| J. Gosley, Childers ... ... ... ... ... | Do. ... ... | 83 |
| Dunheved Poultry Farm, St. Mary's, N.S.W. ... | Do. ... ... | 82 |
| Mrs. Munro, Sunnyside, Warwick ... ... | Do. ... ... | 82 |
| A. H. Padman, Pirie, st., Adelaide, S.A.... ... | Do. ... ... | 81 |
| C. T. Clark, Kenwyn st., Red Hill ... ... | Do. ... ... | 80 |
| E. A. Smith, Hawthorne st., Paddington... ... | Do. ... ... | 80 |
| R. Jobling, Brookstown, Wallsend, N.S.W. ... | S. L. Wyandottes ... | 71 |
| C. Knoblauch, Hawthorne st., South Brisbane ... | White Leghorns ... | 68 |
| J. M. Manson, care of Brabant and Co., Brisbane | Black Orpingtons ... | 66 |
| A. W. Bailey, Kenwyn st., Red Hill ... ... | White Leghorns ... | 66 |
| H. Harnill, Kogarah Bay, Kogarah, N.S.W. ... | Do. ... ... | 61 |
| J. M. Manson, care of Brabant and Co., Brisbane | Do. ... ... | 61 |
| R. Jobling, Brookstown, Wallsend, N.S.W. ... | Do. ... ... | 57 |
| Moritz Bros., Kalangadoo, S.A. ... ... .. | Do. ... ... | 56 |
| W. Purvis, Granville Beach, Port Adelaide, S.A. | Do. ... ... | 55 |
| W. Lyell, Graceville Avenue, Graceville... ... | Do. ... ... | 54 |
| T. Fanning, Ashgrove, Brisbane ... ... ... | Black Orpingtons ... | 54 |
| Cowan Bros., Acton st., Croydon North, N.S.W. | White Leghorns ... | 53 |
| J. Zahl, Boonah ... ... ... ... ... | Do. (No. 2) | 53 |
| P. Clayton, Blacktown, N.S.W. ... ... ... | Do. ... ... | 50 |
| Derrylin Poultry Farm, Mutdapilly ... ... | Do. ... ... | 49 |
| E. F. Dennis, Herston road, Kelvin Grove ... | Do. ... .. | 48 |
| E. V. Bennett, Kalangadoo, S.A. ... ... ... | Do. ... ... | 48 |
| J. H. Gill, Moorabbin road, Cheltenham, Victoria | Do. ... ... | 44 |
| Kelvin Poultry Farm, Kelvin Grove ... ... | Do. ... ... | 43 |

| Competitors. | Breed. | April. |
|---|---|---|
| W. Meneely, Freestone Creek, Warwick ... ... | Black Orpingtons ... | 30 |
| R. Burns, Sladevale, Warwick ... ... ... | Do. ... ... | 37 |
| J. Zahl, Boonah ... ... ... ... ... | White Leghorns (No. 1) | 34 |
| Geo. Tomlinson, Boonah ... ... ... ... | Do. ... ... | 33 |
| E. Pocock, Palmer street, Windsor ... ... | Do. ... ... | 31 |
| G. H. Turner, Aratula, Fassifern ... ... ... | Do. ... ... | 30 |
| Loloma Poultry Farm, Rockdale, N.S.W. ... | Rhode Island Reds ... | 26 |
| E. A. Smith, Hawthorne st., Paddington ... ... | Black Orpingtons ... | 23 |
| E. Le Breton, McNab st., Milton ... ... ... | White Leghorns ... | 22 |
| J. Aitcheson, Oxford st., Paddington ... ... | Do. ... ... | 18 |
| Cowan Bros., Acton st., Croydon North, N.S.W. | Black Orpingtons ... | 17 |
| W. H. Forsyth, Willoughby, N.S.W. ... ... | White Leghorns ... | 15 |
| J. G. Richter, Aratula, Fassifern ... ... ... | Do. ... ... | 8 |
| W. Lindus, Main st., Cessnock, N.S.W. ... ... | Do. ... ... | 6 |
| R. Burns, Sladevale, Warwick ... ... ... | S. L. Wyandottes ... | 4 |
| F. Clayton, Blacktown, N.S.W. ... ... ... | Rhode Island Reds ... | 0 |
| J. R. Johnston, Junction Estate, Warwick ... | Plymouth Rocks ... | 0 |
| S. Chapman, Murphy's Creek ... ... ... | Brown Leghorns ... | 0 |
| Totals ... ... ... ... ... | ... | 3,936 |

## FINAL REPORT, EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, 1914-15.

Our eleventh egg-laying competition was brought to a close on 31st March, 1915. Forty-two entries had been received, but two withdrew, leaving forty competing pens. These were made up as follows:—White Leghorns, 32 pens; Black Orpingtons, 4 pens; Brown Leghorns, 2 pens; and 1 pen each of Silver-laced Wyandottes and Rhode Island Reds, making a total of 240 competing birds. The number of eggs laid during the twelve months was 54,202, an average of 1,355 per pen, or nearly 226 per bird, constituting a new world's record. The birds were a splendid lot of layers, for although many of them had a bad start, owing to chicken-pox and moulting, they performed well when once they commenced to lay, there being only four pens that did not reach the 1,200 eggs; these four were, moreover, very unlucky at the start, while one (J. Murchie's) contained only five hens during the last three and a-half months. It may be mentioned also that the pens owned by J. D. Nicholson, Mrs. Bradburne, J. N. Waugh, and R. Jobling were returned on the morning of 28th March, thus losing three days of the twelve months.

The total value of the eggs laid was £248 10s. 1d., while the cost of food was £84 16s. 8d., leaving a profit, exclusive of labour, of £163 13s. 5d. over the cost of feeding. This profit is less than last year's, owing to the higher price of wheat, and it would have been still further reduced if we had not been fortunate enough to have the bran and pollard supplied under an old contract which only expired at the end of February last.

Nineteen birds died during the year. This is the largest percentage of deaths we have yet had in our competition, due largely to chicken-pox and the after effects thereof, one of which was indigestion, while four died from a growth in the throat.

As in previous years, strict attention has been paid to the feeding. For the benefit of beginners, it is proposed to go a little more fully into this question than has formerly been the case. Many people want to know exactly how much we feed; so, although it is impossible to lay down any hard-and-fast rules, we are giving the average. It must, however, be distinctly understood that the quantities given must not be fed every day in the year. Birds when not laying eat far less than they do when laying heavily, hence the feeder must find out just what is required at certain times. For instance, the quantity of wheat is given as six handfuls, one to each bird, but sometimes they will only eat five, whilst at others the same six birds will eat seven handfuls. For the morning meal the following were mixed together:—14 lb. pollard, 9½ lb. bran, 1½ lb. sunlight oilcake, and 1¼ lb. desiccated meat. The above were all weighed dry, making about 1¾ oz. for each bird, before having the water added. This quantity fed 240 birds. At mid-day they were given chaffed green lucerne, a good handful for six birds, also, once or twice a week, the same quantity of soup meat. The evening meal consisted of about 12 oz. of wheat per pen, or 2 oz. per bird average, the latter being fed about 5 o'clock. Oats and peas were fed on Sunday mornings and holidays, when bran and pollard were omitted. Fresh clean water was given every morning, while shell grit was at all times available. Two hundred and sixteen birds were broody during the competition period.

The following amounts were won as prize money:—

| | £ | s. | d. |
|---|---|---|---|
| A. T. Coomber, Brown's Estate, Bundaberg .. .. | 7 | 17 | 0 |
| Moritz Bros., Kalangadoo, S.A. .. .. .. .. | 4 | 14 | 0 |
| Loloma Poultry Farm, Rockdale, N.S.W. .. .. | 2 | 12 | 0 |
| T. Fanning, The Gap, Ashgrove, Brisbane .. .. | 2 | 3 | 4 |
| J. T. Coates, Harveston, Rockhampton .. .. .. | 0 | 10 | 0 |
| Cowan Bros., Acton street, Croydon N., N.S.W. .. | 0 | 3 | 4 |
| Derryling Poultry Farm, Mutdapilly, Harrisville .. | 0 | 10 | 0 |
| E. V. Bennett, Kalangadoo, S.A. .. .. .. .. | 0 | 10 | 0 |
| J. E. Bradley, Marville Poultry Farm, Moorabbin, V. .. | 0 | 10 | 0 |
| R. Burns, Sladevale, *viâ* Warwick .. .. .. | 0 | 3 | 4 |
| Total prize money .. .. .. .. | £19 | 13 | 0 |

The following are the details of eggs laid each month, also balance-sheet of the competition:—

| Competitors. | Breed. | April. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Grand Totals. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A. T. Coomber, Bundaberg ... ... ... | White Leghorns ... ... | 110 | 107 | 100 | 111 | 143 | 162 | 158 | 154 | 152 | 131 | 122 | 95 | 1,545 |
| Moritz Bros., Kalangadoo, S.A. ... ... | Do. ... ... | 58 | 50 | 118 | 142 | 152 | 157 | 152 | 163 | 160 | 154 | 128 | 110 | 1,544 |
| Loloma Poultry Farm, Rockdale, N.S.W. ... | Do. ... ... | 53 | 93 | 100 | 115 | 154 | 154 | 157 | 169 | 154 | 149 | 119 | 117 | 1,534 |
| T. Fanning, Ashgrove, Brisbane ... ... | Do. ... .. | 98 | 114 | 132 | 132 | 134 | 144 | 142 | 145 | 131 | 115 | 104 | 97 | 1,488 |
| G. Tomlinson, Boonah ... ... ... ... | Do. ... ... | 19 | 48 | 119 | 137 | 159 | 158 | 158 | 150 | 154 | 136 | 130 | 110 | 1,478 |
| Marville Poultry Farm, Moorabbin, Victoria | Do. ... .. | 27 | 39 | 91 | 102 | 148 | 156 | 160 | 161 | 148 | 153 | 140 | 131 | 1,456 |
| R. Burns, Sladevale, Warwick ... ... ... | Black Orpingtons (No. 1)... | 17 | 47 | 115 | 151 | 162 | 163 | 146 | 132 | 142 | 130 | 115 | 129 | 1,449 |
| A. H. Padman, Adelaide, S.A. ... ... .. | White Leghorns ... ... | 44 | 27 | 72 | 123 | 159 | 159 | 159 | 159 | 141 | 143 | 128 | 127 | 1,447 |
| Mrs. Munro, Sunnyside, Warwick ... ... | Do. ... ... | 57 | 21 | 69 | 116 | 153 | 152 | 160 | 165 | 154 | 141 | 126 | 129 | 1,443 |
| T. Fanning, Ashgrove, Brisbane ... ... | Black Orpingtons ... ... | 0 | 8 | 84 | 157 | 165 | 163 | 150 | 157 | 141 | 143 | 132 | 141 | 1,441 |
| Cowan Bros., Burwood, N.S.W. ... ... | White Leghorns ... .. | 44 | 74 | 82 | 112 | 154 | 163 | 159 | 150 | 146 | 137 | 109 | 110 | 1,440 |
| E. Le Breton, Milton, Brisbane .. ... ... | Do. ... ... | 21 | 32 | 95 | 137 | 160 | 159 | 161 | 187 | 147 | 137 | 109 | 131 | 1,426 |
| A. F. Camkin, Kogarah, N.S.W. ... ... | Do. ... ... | 21 | 67 | 92 | 117 | 145 | 156 | 153 | 158 | 152 | 141 | 117 | 103 | 1,422 |
| E. V. Bennett, Kalangadoo, S.A. ... ... | Do. ... ... | 10 | 25 | 87 | 140 | 151 | 151 | 147 | 134 | 146 | 158 | 131 | 127 | 1,416 |
| Derrylin Poultry Farm, Mutdapilly ... ... | Do. ... ... | 29 | 22 | 87 | 120 | 144 | 153 | 163 | 150 | 152 | 138 | 129 | 129 | 1,416 |
| F. McCauley, Maryborough ... ... ... | Do. ... ... | 36 | 18 | 81 | 123 | 142 | 153 | 154 | 149 | 142 | 142 | 128 | 112 | 1,380 |
| R. Burns, Sladevale, Warwick ... ... ... | Silver Laced Wyandottes ... | 4 | 38 | 111 | 147 | 162 | 153 | 148 | 129 | 130 | 122 | 117 | 118 | 1,379 |
| Loloma Poultry Farm, N.S.W. ... ... . . | Rhode Island Reds... ... | 40 | 87 | 106 | 126 | 152 | 153 | 156 | 130 | 131 | 124 | 97 | 71 | 1,373 |
| R. Burns, Sladevale, Warwick ... ... ... | Black Orpingtons (No. 2)... | 17 | 27 | 102 | 139 | 153 | 158 | 147 | 141 | 138 | 136 | 106 | 108 | 1,372 |
| J. T. Coates, Harveston, Rockhampton ... | White Leghorns ... ... | 45 | 21 | 80 | 124 | 141 | 156 | 147 | 147 | 137 | 139 | 123 | 98 | 1,358 |
| Mrs. Bieber, Childers ... ... ... ... | Brown Leghorns ... ... | 75 | 57 | 73 | 92 | 142 | 151 | 152 | 148 | 135 | 132 | 111 | 84 | 1,352 |
| J. R. Wilson, Eudlo ... ... ... ... | White Leghorns ... ... | 55 | 47 | 110 | 136 | 124 | 141 | 126 | 145 | 133 | 115 | 102 | 116 | 1,350 |
| J. Franklin, Red Hill, Coolabunia ... ... | Do. ... ... | 18 | 31 | 92 | 126 | 155 | 150 | 147 | 153 | 139 | 122 | 111 | 105 | 1,348 |
| J. Zahl, Boonah ... ... ... ... ... | Do. ... ... | 46 | 16 | 48 | 123 | 140 | 138 | 143 | 147 | 144 | 145 | 129 | 125 | 1,344 |
| Kelvin Poultry Farm, Brisbane... ... ... | Do. ... .. | 84 | 108 | 117 | 133 | 141 | 128 | 131 | 123 | 128 | 104 | 93 | 44 | 1,334 |
| J. M. Manson, Brabant and Co., Brisbane ... | Do. (No. 1)... | 19 | 67 | 79 | 110 | 139 | 144 | 140 | 141 | 141 | 136 | 106 | 103 | 1,326 |
| J. T. Coates, Harveston, Rockhampton ... | Black Orpingtons ... ... | 23 | 67 | 133 | 119 | 142 | 149 | 135 | 129 | 114 | 110 | 104 | 94 | 1,319 |
| Range Poultry Farm, Toowoomba ... ... | White Leghorns ... ... | 58 | 19 | 24 | 126 | 148 | 147 | 148 | 140 | 142 | 128 | 118 | 119 | 1,317 |
| C. E. Austin, Boonah ... ... ... ... | Do. ... ... | 77 | 53 | 77 | 101 | 132 | 133 | 138 | 139 | 140 | 121 | 108 | 95 | 1,314 |
| J. Kilroe, Brisbane... ... ... ... ... | Do. (No. 2) . | 72 | 30 | 49 | 107 | 134 | 144 | 145 | 151 | 136 | 137 | 105 | 88 | 1,298 |
| D. Moreton, Coraki, N.S.W. ... ... .. | Do. ... ... | 15 | 24 | 88 | 121 | 140 | 141 | 138 | 140 | 135 | 131 | 98 | 91 | 1,262 |
| J. D. Nicholson, Arncliffe, N.S.W. ... ... | Do. ... ... | 29 | 53 | 100 | 119 | 131 | 132 | 135 | 121 | 125 | 118 | 94 | 83 | 1,240 |
| J. N. Waugh, Bankstown, N.S.W. ... ... | Do. ... ... | 17 | 49 | 96 | 78 | 125 | 130 | 139 | 133 | 125 | 135 | 119 | 94 | 1,240 |
| Mrs. Bradburne, Kogarah, N.S.W. .. ... | Do. ... ... | 40 | 32 | 54 | 111 | 135 | 148 | 151 | 139 | 120 | 105 | 110 | 82 | 1,227 |
| J. Gosley, Childers... ... ... ... | Do. ... ... | 60 | 52 | 80 | 111 | 135 | 146 | 132 | 136 | 114 | 121 | 82 | 46 | 1,215 |
| R. Jobling, Wallsend, N.S.W. .. ... ... | Do. ... ... | 67 | 42 | 88 | 104 | 140 | 139 | 138 | 136 | 134 | 109 | 72 | 36 | 1,205 |
| J. Murchie, Childers ... ... ... ... | Brown Leghorns ... ... | 31 | 16 | 31 | 101 | 139 | 146 | 149 | 140 | 140 | 124 | 107 | 72 | 1,196 |
| J. Kilroe, Brisbane... ... ... ... | White Leghorns (No. 1)... | 54 | 31 | 89 | 112 | 119 | 131 | 128 | 125 | 123 | 106 | 96 | 80 | 1,194 |
| J. M. Manson, Brisbane ... ... ... ... | Do. (No. 2)... | 9 | 42 | 66 | 73 | 128 | 149 | 140 | 135 | 129 | 130 | 93 | 71 | 1,165 |
| C. M. Jones, Rockhampton ... ... ... | Do. ... ... | 29 | 39 | 35 | 95 | 144 | 151 | 147 | 147 | 134 | 105 | 79 | 44 | 1,149 |
| | Totals ... ... | 1,637 | 1,840 | 3,452 | 4,769 | 5,766 | 5 961 | 5,879 | 5,748 | 5,529 | 5.209 | 4,447 | 3.965 | 54,202 |

## BALANCE-SHEET.

*Receipts.*

| | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| Entry fees, 42 at 10s. | | | | 21 | 0 | 0 |
| Sales— | | | | | | |
| Orient Co., 1,299 doz. eggs | 75 | 15 | 6 | | | |
| College dining-hall, 2,479 10/12 doz. | 132 | 9 | 7 | | | |
| Barnes and Co., net returns, 738 doz. | 40 | 5 | 0 | | | |
| | | | | 248 | 10 | 1 |
| Total receipts | | | | £269 | 10 | 1 |

*Expenditure.*

| | | | | | | |
|---|---|---|---|---|---|---|
| Feed— | | | | | | |
| Wheat, 186 bus. | 51 | 6 | 8 | | | |
| Oats, 15 bus. | 5 | 9 | 3 | | | |
| Peas, 6 bus. | 1 | 15 | 6 | | | |
| Bran, 140 bus. | 7 | 0 | 0 | | | |
| Pollard, 210 bus. | 10 | 10 | 0 | | | |
| Oilcake, 4 cwt. | 2 | 7 | 9 | | | |
| Bone, 1 cwt. 1 qr. 20 lb. | 1 | 2 | 10 | | | |
| Desiccated meat, 3½ cwt. | 3 | 4 | 8 | | | |
| Green lucerne | 1 | 10 | 0 | | | |
| Soup meat | 0 | 10 | 0 | | | |
| | | | | 84 | 16 | 8 |
| Deduction by Orient Co., account broken eggs | | | | 0 | 7 | 0 |
| Legbands | | | | 0 | 16 | 9 |
| Prize money | | | | 19 | 13 | 0 |
| Net profit on competition | | | | 163 | 16 | 8 |
| Total expenditure | | | | £269 | 10 | 1 |

P. M. PITT, for Principal.

## CHOKING.

Cases of choking are frequently heard of, have occurred to our own knowledge in Brisbane, and once in our own case at Texas. In this latter case fortunately a doctor was at the dinner table and relieved us of the trouble. The "Journal of the Jamaica Agricultural Society" writes on this subject:—

"It is seldom that people know what to do in such cases, in the absence of a skilled physician; yet relief may be surely and quickly obtained by pouring the white of an egg (raw) down the sufferer's throat. This remedy never fails because the egg will slip down the throat and render the obstruction so smooth that it will readily pass on down. This remedy is just as effective for animals as for human beings. To administer the dose to an animal, however, is not always easy. The correct way is to place the white of the eggs in a bottle, raise the animal's head, thrust the bottle well back, and empty."

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF APRIL, 1915.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Lady May ... | Ayrshire ... ... | 7 Mar., 1915 | 823 | 3·6 | 34·68 | In addition to pasture on natural grasses, the dairy cows received a ration of ensilage. |
| Thornton's Fairetta | Jersey ... ... | 27 Mar. ,, | 566 | 4·9 | 32·70 | |
| Miss Melba... | Holstein ... ... | 6 Mar., 1914 | 724 | 3·6 | 30·51 | |
| Iron Plate ... | Jersey ... ... | 21 Feb., 1915 | 481 | 5·1 | 28·95 | |
| Madame Melba | Holstein ... ... | 8 Sept., 1914 | 596 | 4·0 | 27·98 | |
| Honeycomb | Shorthorn ... | 27 July ,, | 481 | 5·4 | 26·98 | |
| Lady Melba | Holstein ... ... | 6 Mar. ,, | 535 | 4·2 | 26·40 | |
| Nina ... | Shorthorn ... | 18 Feb., 1915 | 638 | 3·5 | 26·10 | |
| Bella ... | Ayrshire ... ... | 19 Jan. ,, | 578 | 3·8 | 25·73 | |
| Miss Jean ... | ,, ... ... | 24 Jan., 1914 | 459 | 4·7 | 25·42 | |
| Cocoatina ... | Jersey ... ... | 6 Mar., 1915 | 493 | 4·3 | 24·94 | |
| Miss Lark ... | Ayrshire ... ... | 31 Oct., 1914 | 428 | 4·8 | 24·22 | |
| Sweet Meadows | Jersey ... ... | 28 July ,, | 330 | 6·2 | 24·22 | |
| Burton's Lily | Shorthorn ... | 17 Nov. ,, | 488 | 4·2 | 24·09 | |
| Simple Interest | Jersey ... .. | 24 Nov. ,, | 440 | 4·6 | 23·84 | |
| Nellie II. ... | Shorthorn... ... | 20 July ,, | 570 | 3·6 | 23·79 | |
| Glen ... | ,, ... ... | 20 Oct. ,, | 453 | 4·4 | 23·46 | |
| Lady Loch II. | Ayrshire ... ... | 8 Feb., 1915 | 470 | 4·2 | 23·19 | |
| Butter ... | Shorthorn... ... | 20 Nov., 1914 | 514 | 3·8 | 22·89 | |
| Lady's Maid | ,, ... ... | 2 Feb., 1915 | 472 | 4·1 | 22·72 | |
| Lady Margaret | Ayrshire ... ... | 19 June, 1914 | 384 | 5·0 | 22·65 | |
| Lady Annette | ,, ... ... | 26 Dec. ,, | 417 | 4·6 | 22·60 | |
| Miss Bell ... | Jersey ... ... | 3 Aug. ,, | 318 | 6·0 | 22·57 | |
| Violette's Peer's Girl | ,, ... ... | 22 Oct. ,, | 378 | 5·0 | 22·30 | |
| Rosebud II. | Ayrshire ... ... | 20 Sept. ,, | 375 | 5·0 | 22·12 | |
| Silver Nell... | Shorthorn ... | 5 Oct. ,, | 369 | 5·0 | 21·77 | |
| Pauline ... | ,, ... ... | 12 Oct. ,, | 363 | 4·9 | 20·97 | |
| Lowla II. ... | Shorth'rn-Ayrshire | 23 Sept. ,, | 442 | 4·0 | 20·74 | |
| Countess of Brunswick | Shorthorn ... | 27 July ,, | 391 | 4·5 | 20·72 | |
| Lady Dorset | Ayrshire ... ... | 20 Sept. ,, | 394 | 4·4 | 20·40 | |
| Special Edition | Jersey ... ... | 19 Dec. ,, | 345 | 5·0 | 20·35 | |
| La Hurette Hope | ,, ... ... | 21 Aug. ,, | 316 | 5·4 | 20·16 | |
| Dolly ... | Shorthorn... ... | 19 Dec. ,, | 478 | 3·6 | 20·14 | |
| Auntie's Lass | Ayrshire ... ... | 16 Feb., 1915 | 504 | 3·4 | 20·2 | |

# State Farms.

## BUNGEWORGORAI—REPORT FOR MONTH ENDING 31ST MARCH.

*Meteorological.*—Dry conditions prevail, and are at present acute, as during the last three months only 60 points have been recorded, whilst the total precipitation during the last eight months only totals 654 points. The maximum temperature recorded was 104 degrees—average, 92·0 degrees. The minimum temperature recorded was 56 degrees—average, 67·8 degrees. Rainfall, nil.

*Orchard.*—The effects of the continued dry weather are very evident here, more especially in the citrus area, where a number of trees have been completely destroyed.

*Vineyard.*—Even in this department the effects of the absence of rain are very marked.

*Farm.*—Operations in connection with the preparation of land for the forthcoming winter cereal crop have been suspended for some considerable time, owing to condition of the ground preventing satisfactory work being accomplished.

*Stock.*—Horses and cattle look exceptionally well. All are being fed on silage, chaff, and grain, and have been for some time past. So far the lack of natural food in the paddocks has not occasioned any sickness amongst them.

*Water.*—A fair amount of the water required for the stock has to be pumped, owing to lack of sufficient wind and absence of surface water.

*Paddocks.*—The prickly-pear throughout the paddocks has been poisoned with an injector, fair results being obtained. Advantage has been taken of the dry spell to burn some of the fallen timber with which some of the paddocks are littered, and will be continued with as other work permits.

Three lots of farmers' wheats have been graded. Samples submitted were extremely dirty, being infested with oats, barley, chaff, &c.; but the machine did splendid work, the growers being more than satisfied.

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## NOTES FROM KAMERUNGA STATE NURSERY, CAIRNS, APRIL, 1915.

*Meteorological.*—Rainfall, 3·52 inches.

Days on which rain fell, 11.

Maximum temperature, 90·5 degrees on the 12th.

Minimum temperature, 63 degrees on four days.

Rainfall since 1st January, 1915, 15·52 inches, being only half of the previous minimum rainfall (1897) for the same four months. While

no rain fell during the first half of the month, in the latter half we were blessed with nice steady soaking showers, and advantage was taken to plant out many seedlings into Nursery beds.

*Coffee.*—Pickings have already started; that for young trees—which are the most forward—has been cleaned as parchment, while the small pickings from the older trees have been prepared for seed.

*Vanilla.*—For a time it looked as though this crop was going to suffer badly, owing to continued dry weather; but with the rain the vines have picked up and show a good healthy colour.

*Bananas* appeared to suffer less than anything else from the shortage of rain—that is, where cultivation had been carried on—and the fruit has been very free from attacks of fruit fly.

## A POSSIBLE QUEENSLAND INDUSTRY—COTTON SEED OIL AND CAKE.

We have for many years advocated the growing of cotton by farmers on small areas, and have especially laid stress on the value of the crop in a dry season such as we are now experiencing, owing to its drought-resisting capabilities. When few other crops survive a protracted dry season, cotton continues to grow and to produce its crop. We have never yet seen a cotton field destroyed by drought. During the long drought of 1902, we saw cotton plants in full bearing in the Western country. The fibre is not the only valuable portion of the crop. The seeds contain a valuable edible oil, which, it is said, is often sold as olive oil. When the oil is expressed, there still remains the oil cake, which, as all dairymen know, forms an excellent food for stock.

In the far North, near Cairns, we find the only progressive cotton company in the State. This is the Gossypium Park Company, whence many hundreds of bales of cotton have been shipped during the past few years. A paragraph in the "Cairns Post" informs us the the company has now added the manufacture of cotton-seed oil and cake to its activities. The "Post" says:—

"We have had forwarded from Gossypium Park Estate a sample of crude oil extracted from cotton seed by an hydraulic pressure of 85 tons. This oil Mr. Campbell is placing on the local market for culinary purposes in the preparation of fish and other dishes, while the cake is finding a ready sale among stock fatteners in the country districts. It will probably come very largely into use in place of the cake hitherto used, as it can be supplied at 12s. 6d. per cwt., as against 14s. per cwt. in the case of the other, and Mr. Campbell guarantees it to be 25 per cent. richer. In the ordinary cake all the oil is extracted except some 5 or 10 per cent., but at Gossypium Park 45 per cent. of the oil is left, to the great improvement of the cake, of which only 4 lb. per diem per head is required for fattening stock.

# The Orchard.

## BANANA CULTIVATION—PRUNING AND TREATMENT OF SUCKERS.

By R. G. BARTLETT, Buderim.

In Jamaica a great deal of attention is given to this subject in order to produce fruit when the market demand is keenest and prices therefore highest.

Queensland growers know the great difference in prices obtaining in January and February compared with those of May to September or October. The returns from plantations would be very materially increased if we could regulate our fields to throw bunches in, say, March or April. These bunches are always large and they mature during the months of good prices.

It has been the practice on the school plot to carry out the main pruning in February and March. At that time a fair-sized "follower" is left to each of the three main suckers forming the stool. During the rest of the year the small "peepers" (suckers) are pruned out as they appear. The result has been that 66 per cent. of the total crop has been harvested in the six months, June to December. Actual figures are 54 bunches for six months, January to June, and 103 bunches from July to December. Out of the total 157 bunches only 24 bunches were harvested in January and February—months of wet weather and exceedingly low prices.

Of course it will require careful testing before conclusive results are obtained to show which is the best month or months to allow "followers" to go ahead in order to gain the desired end—*i.e.*, majority of bunches harvested during time of best prices. In this connection, the views of your readers who have considered this matter would be valuable if you could spare space in your Journal for the discussion of this subject.

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## THE SEX OF PAWPAW PLANTS.

Mr. Ernest C. Davies, Charters Towers, writes:—

"Mr. C. Ross, in your May number, tells 'A.H.F., Diddillibah,' that there is no way to tell sex in young papaw plants. Here's an idea that is advocated by Mr. Geo. Johnson, Curator of Lissner Park, Charters Towers. I have tried it repeatedly with marked success. To get females, plant only about 5 per cent. of your seedlings, choosing the very smallest and sickliest-looking plants. Destroy all the big strong fellows. Watch for the plants that come up after the main lot have germinated; they are often females. The idea is taken from the general rule of Nature, that the female is mostly weaker and smaller in infancy. Watch a litter of puppies or a batch of chickens, for instance. Of course, the rule is not absolutely certain, for there is often a sickly male in every part of Nature, and, *vice versa,* an extra sturdy female; but I get over 80 per cent. of female papaws in this way, and I recently scored twenty-four out of twenty-five plants."

## A FINE BUNCH OF BANANAS.

The accompanying illustration shows a magnificent bunch of bananas grown by Mr. W. Power on his farm in the parish of Goomboorian, about 11 miles from Gympie.

The bunch originally consisted of 307 fruits, and was part of a first crop grown on virgin scrub land. The season had been very

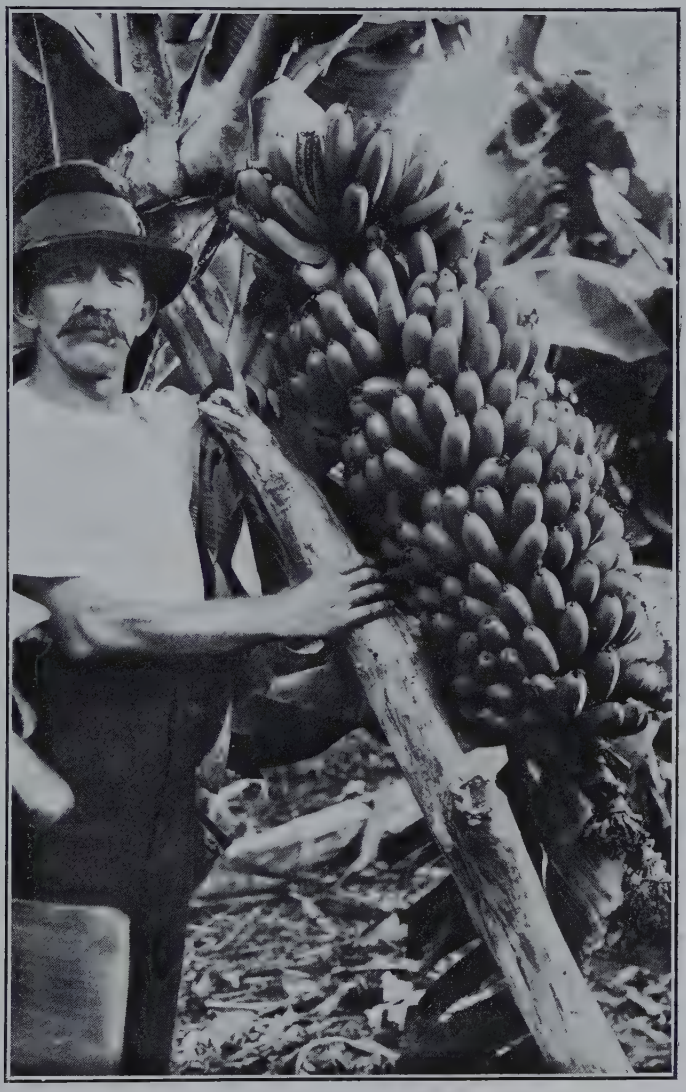

PLATE 25.—BANANAS GROWN BY MR. W. POWER, GOOMBOORIAN.

unfavourable, no rain having fallen since Christmas. Mr. Power says there is a very large scope of country in Goomboorian still standing scrub—equal or superior to the country on which this bunch was grown. The drawback to the country is want of good roads.

# Tropical Industries.

## NOTES ON VANILLA CULTURE.

By HOWARD NEWPORT, Instructor in Tropical Agriculture, Cairns.

### PLANTING.

The planting up of the vanilla demonstration plot at Babinda was carried out during the first week in February. The plot is situated in the Babinda Valley, about 3 miles from the railway station of that name. This valley runs between the two highest mountains of North Queensland (and second highest in Australia), Bellenden Ker on the north and Bartle Frere on the south, and is an offshoot of one of the finest valleys of agricultural land to be found anywhere in the world. This grand valley runs for some 100 miles more or less parallel with the coast, and is watered by a series of rivers, commencing with the Mulgrave and including the Russell, North Johnstone, South Johnstone, Moresby; Liverpool and Maria Creeks (really rivers, having direct outlet to the sea); the Hull, Tully, Murray, &c., and by innumerable creeks, many of them as big and important as rivers, tributary to these rivers. The valley is of varying width, from 2 to 5 or more miles, and has a range of foothill between it and the sea on the eastern side protecting it from unduly strong sea gales, with a higher range on the western side high enough to attract and insure a regular and sufficient rainfall. The land is fairly flat, excellently watered, richly timbered, and affords some of the finest agricultural land to be found in the State. At Nelson, Babinda, Goondi, and the South Johnstone, sugar mills are situated and cane is found to grow to perfection, as will almost any tropical staple; while for vanilla, owing to its natural protection from gales, its humidity, and the straight and uniform growth of timber, it presents conditions unique in their eminent suitability for the staple and such as are to be found hardly anywhere else in the world.

In this valley, and on a small flat of sandy loam of a sedentary basaltic origin, on the bank of a permanent creek of clear, cool, sparkling water, a tributary of Babinda Creek (itself really a river, but emptying into the Russell some 10 miles from its mouth), is situated the Government demonstration plot of vanilla.

The land is portion of a farm belonging to Dr. J. H. Reed, of Cairns, who has entered into an agreement with the Department of Agriculture and Stock, in consideration of the Department supplying plants, and, through its officers, the requisite knowledge and experience, at his own expense, to carry out all the work required in cultivating and bringing the plantation to fruition, and in harvesting, curing, and marketing the crop for a term of years.

The planting up of the plot occasioned some interest. The first remark of visitors generally was, "Ah! I see you are opening an experimental plot." On my replying that it was not an experimental plot

but a demonstration plot, they said, "Well, what's the difference?" The difference is just this—An experimental plot necessitates every few plants being treated differently for some object or other, and involves a certain amount of dead, unprofitable, or negative work, and also implies some uncertainty as to results, whereas in vanilla the experimental work has been done at the Kamerunga State Nursery in past years, and in these demonstration plots it is not proposed to experiment or to do any unprofitable work, but to demonstrate on a commercial scale the feasibility of the practical culture of the staple in hand.

The Babinda vanilla plot is an acre in extent; this may sound small, but for so high priced a commodity, and for the purpose, it is sufficient.

The cuttings necessary for planting up were obtained from the experimental plot known as the old vanillary at the Kamerunga State Nursery.

In taking cuttings, the vines that had been allowed to run up the trees especially for the purpose were taken where possible. These were strong and straight, but other parts of the vines cut could not be discarded merely because they had grown crooked or bent. A considerable proportion were strong, straight cuttings, and all were good healthy specimens, 2½ to 3 ft. long, averaging six to ten eyes or nodes. The vanilla being soft-bodied, the fear in transport is bruising on the one hand and drying or withering on the other. The more leaves on the cuttings, therefore, the more recourses they have for moisture, hence they travel best without trimming. On unpacking, the first work, therefore, was to trim them, which was done with a small pair of secateurs. Each cutting was taken up and examined, and was first topped and tailed—*i.e.*, any portion of the stem that had been left on more than half an inch or so above or below the last eye or node at each end was cut back to that length. This was with cuttings that had been cut at both ends, as most of them were. Those having a growing tip at one end only required tailing, of course, unless the tip had been damaged by being crushed or broken. Tip cuttings, generally speaking, are better than those cut at both ends and come away quicker, but are more delicate and do not survive a long or rough journey half so well as ordinary cuttings. For planting near the source of supply tip cuttings are preferable, if obtainable, but the proportion in an ordinary consignment is naturally small, for a length of vine of 20 to 30 ft. divided into cuttings will afford ten to twelve ordinary ones with, normally, only one tip cutting. Branch shoots and shorter vines supply a larger proportion, but no consignment could be made up consisting purely of tip cuttings.

After topping and tailing, the base end which is to be put in the ground has to be relieved of its leaves. It is not always easy at first glance to tell which is the base end, for the leaves do not always incline upwards. When taken from a vine that has been looped over supports the leaves may be at right angles, be inclined downwards, or even twisted right round. No mistakes can be made if it is borne in mind that

the bud is always in the axil of and *above* the base of the leaf, which protects it. While sitting in the shade of the clearing with a crate of cuttings before one, the trimming, easy as it is, requires a little attention to business to prevent mistakes being made with the knife or secateurs that cannot be remedied. Roughly, one-third of the length of the cutting has to go below ground and two-thirds above against the supports. While the cuttings are usually made fairly uniform in length, the length of the nodes differs materially—a 2 ft. 6 in. cutting may have six to ten eyes. In a six-eyed cutting three, and in an eight to ten eyed cutting four leaves are removed. This is done by clipping the petiole or stalk of the leaf as near the stem as possible without damaging the bud, and has been found advisable in expediting root growth. Cuttings planted with the leaves adhering to the portion underground will not necessarily die, but they have been found to rely for an unduly long time on the sap in the fleshy leaves without making roots, and the ultimate rotting of the leaves may extend to the stem to which it is still attached. The portion aboveground, on the other hand, needs all the nutriment it can obtain from, and per medium of, the leaves, which in no way interfere with but rather encourage the growth of tendrils, adventitious roots, and new shoots, by protecting the eyes, &c. Similarly to the portion below ground, it does not necessarily mean that in the absence of leaves the cutting is doomed. It may still thrive, though it has been found more advantageous for the portions covered to be leafless, while they are retained on the visible portion when planted.

The next operation is the removal of all tendrils or adventitious roots or rootlets from all parts of the cutting, whether new and fresh or old and dry, which is done in a similar manner to the leaves on the basal portion. It has been found that once a tendril or adventitious rootlet has been separated from anything to which it has been attached it very seldom grows again, generally dying off and new ones making their appearance. The presence of the old tendrils, &c., even if fresh looking, only hinders the production by the plant of new ones, while their neat removal materially encourages new growth of this nature. The appearance of tendrils is the first sign of activity the plant makes, and they serve to anchor the vine to its support and hold it in place for the growth that will follow. These sucker-like tendrils are what are first looked for by the planter as evidence of vitality and development in the newly planted clearing.

After topping and tailing, removing the requisite number of leaves and all tendrils or adventitious roots, the cuttings are ready to plant out. In carrying them to the different parts of the clearing care must be taken, for the 2½ to 3 ft. length of soft vine is quite heavy enough, if only a dozen or two are taken carelessly or by one hand, to cause the lower ones to fold or break. Once thus broken very seldom will any growth be made above the break, and if so broken a cutting has much better chance if subdivided at any such break and planted separately. This calls to mind the experience of one grower who, on having been supplied with 200 2 ft. 6 in. cuttings, promptly proceeded to double the number by cutting them in half, and was subsequently

disappointed at the amount of growth compared with other planters. Such subdivision would seem all right and might work with many other plants, but with vanilla the growth is largely in ratio to the length of cutting used. Cuttings longer than 5 or 6 ft. have not been experimented with certainly, being too cumbersome and extravagant when plants are at a premium; but it has been amply demonstrated that up to that length the longer the cutting the quicker the growth, and *vice versâ*.

A young vine with 6 ft. of growth, if the upper half be taken for a cutting and planted adjacent to it, is thrown back so as to be no nearer advanced to maturity and crop-bearing than its progeny. Hence taking cuttings from a new plantation of, say, a year old, while enabling the area to be increased, retards the bearing of the original planting by just that period; and reducing the cuttings to less than 2½ ft. (which has been found here the most satisfactory size, in view of the limited quantity of stock plants and a reasonable time of coming into bearing) only reduces the rate of development proportionately.

The next process, the actual planting of the cuttings, is a comparatively simple matter and quickly done. The pitting merely consists of loosening the ground to a depth of a few inches—4 or 5 is ample—and removing roots or stones that may be met with. The point is to get the plant in the most advantageous position. If the clearing has been properly brushed, the side of the tree against which the cutting is put does not matter very much. If convenient, it should be on the leeward side from the prevailing wind and on the shady side. Vanilla grows quickest in the comparatively more shaded parts and bears best in the comparatively lighter parts, but the vine can be trained later into the best position, which matter will be dealt with when that work is being done on the demonstration plot.

It is best to carry a trowel or some such implement with one when planting, and also to have a mattock handy. Sometimes the spot decided on is found to have big roots just below the surface, and as the vanilla must be planted *close* to the trunk of its living support it is not allowable to go further off, so another spot must be selected further round the tree. The soil is loosened but not taken out, to a width of, say, 3 or 4 in., and of sufficient length to take the cutting—generally 12 to 15 in. at most. When loosened, the part of the cutting from which the leaves have been removed is laid not more than 2 in. below the surface, and the soil firmed down by hand, the larger portion of the cutting with its leaves intact is gently bent so as to lean vertically against, and close to, the tree. It is best to complete the planting as quickly as possible, to prevent any possibility of the cuttings wilting unduly, and then to come back for the next operation of tying.

For tying, a soft sort of rather thick, tarred twine known as "marlin" has been found the best, but anything that is not thin and hard enough to cut the vines or rot away in the wet too quickly will do. In tying care must be taken to bend the cutting so that at least one, and as many eyes as possible, are actually in contact with the bark of the supporting tree, for from these eyes will the new tendrils grow and fasten themselves on. In round trees the marlin is passed right round

the tree and cutting and tied firmly, but not too tightly. Where a tree has flanges and encircling would not accomplish its purpose, nails are used, two being put in 6 in. or more apart on each side of the cutting, and the tie made from one to the other over the cutting. Generally it is best to plant one cutting to each tree 1 ft. or less in diameter, and two to trees larger than this. The actual number to an acre will be found to vary as the density of the scrub varies, and if trees are too far apart for rails or bars of 9 or 10 ft. to be conveniently fastened from one to another the number of vines that can be planted will be found less than 500, but this number is made up later by planting against the posts that will have to be put in to support the rails. In such cases it is best to plant a greater area and to wait till the first planting necessitates the erection of rails—a year or perhaps two years later, and then to get more plants to fill up. Five hundred is quite enough for an acre, though it would be quite easy to plant more.

The last process of planting is covering in—that is, covering with dead leaves the soil over the basal end of the planted cutting. This is to prevent drying and evaporation of the moisture as well as to supply plant food for the roots when they appear, and which is obtained largely from decaying leaf and vegetable matter. This may be done when planting the cuttings, but if left to the last serves also as an opportunity to have a final look round and see that all the other operations are correct. that none have been overlooked, and that all is ship-shape.

The clearing will be now under way and should require no more attention for some time. With reasonable weather growth may be expected in four to six weeks, which will become more and more rapid for a year. It is as well, of course, to see that undergrowth, or other ærides and epiphytes on the trees, do not interfere with the vanilla, but no further attention should be required until the operation of erecting the bars.

The principal cost, so far, will have been the plants themselves. The 520 for the Babinda demonstration plot, valued at 6d. each, amount to £13. The brushing took seven men in all, and was heavy on account of the necessity for cutting up heavy limbs of trees that had fallen in parts against the base of the trees. The planting took four men, making eleven men in all, who at 9s. 2d. (sugar rates) cost £5 0s. 10d. Freight on the crates of cuttings and return of empty crates amounted to 4s. 2d., and the marlin for tying (8 hanks) cost 12s., making a total of £18 17s.

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## CHICORY *(CICHORIUM INTYBUS).*

Chicory, or succory, as it is sometimes called, is an herbaceous perennial plant belonging to the natural order Compositae. Its roots are strong and fleshy, penetrating to a considerable depth in loose open soil. The lower leaves resemble those of the well-known dandelion; the upper leaves are ovate (egg-shaped). The stems are alternately branched, from 2 to 6 feet high, and they become woody after the flowering period. The flowers, of which a great many are borne, are

arranged along the stems, two being usually placed close together, and are of a bright sky-blue colour, rarely white. The fruits are small, one seeded, angular nuts.

The plant is common in many parts of England on gravelly and chalky soil, in waste places, and along road-sides. It is grown in many parts of the continent of Europe, especially where small holdings are prevalent, as a forage crop, to be cut and consumed in a green state, or used for the grazing of sheep and cattle, which are very fond of it. The young leaves are often used like spinach, and in Europe the tender young roots are used as a vegetable, like carrots. The root of the chicory plant is of the order of the beet or salsify root. As a cultivated plant it has three distinct applications. Its roots, roasted and ground, are used as a substitute for, adulterant of, or addition to, coffee. Both roots and leaves are employed as salads, and the plant is grown as a fodder or herbage crop, which is greedily eaten by cattle.

The largest quantities of chicory were grown in Belgium and France previous to the great war of 1914. When grown for the sake of the root, the leaves should not be cut or pastured before harvesting. It is important to note that the leaves should not be fed to milch cows, as they make the milk bitter.

As a farm crop, its chief advantages are its adaptability to dry poor soils, its power of growing several large cuts of green food per annum when once established, its perennial character and easy cultivation. It is an exceedingly hardy crop.

### Soil Preparation.

Experience has shown (we learn from Messrs. Wilcox and Smith's "Farmers' Cyclopaedia of Agriculture") that chicory is adapted to any good loam soil that will produce good root crops, and that it will thrive wherever the sugar beet or mangolds do well.

Land for chicory should be deeply ploughed in the spring, be well harrowed, and worked down to pulverise all lumps and make it compact, and again harrowed just before the seed is sown, to kill all germinating weed seeds.

### Planting.

The seed may be sown at any time in fine weather in the spring, in rows 18 to 24 inches apart if horse cultivation is intended, and from 12 to 24 inches apart if the crop is cultivated by hand. From 1 to 1½ lb. of seed is required per acre, but for use as a green crop from 10 to 12 lb. of seed are usually sown. The seed should not be covered more than three-quarters of an inch deep, and not more than one-half inch in heavy or wet soils.

### Cultivation.

After the plants are up, they will need frequent shallow cultivation with some of the light cultivators made especially for sugar beets, to kill the weeds and preserve the soil moisture. When the plants have attained the height of 2 or 3 inches, they should be thinned out to stand from 4 to 6 inches apart. Only one plant should be left in a place.

### HARVESTING.

If chicory is grown for forage, a crop of leaves can be cut in the autumn, and afterwards two or three crops per annum will be provided. It is best cut just when the flowering shoots are extended, and before they become woody and hard, or the field can be grazed at intervals instead. The plant usually lasts (as a forage plant) in a productive state for four or five years.

PLATE 26.—CHICORY ROOTS AND LEAVES.

In harvesting the root crop, a beet loosener may be run along the rows. This breaks the connection of the roots with the soil so that they can easily be lifted by hand. A less convenient way is to run a plough alongside the rows so as to expose the roots on one side. Special machinery has also been devised, and is procurable in the United States or in Europe (Holland, Belgium, Switzerland before the war) for

pulling the roots. After removal from the ground, the tops are cut off at the base of the bottom set of leaves. The roots should not be pulled until they are ripe, and this stage is indicated by the disappearance of the milk from the roots.

PLATE 27.—CHICORY PLANT IN BLOSSOM.

If it is desired to keep the roots some time before delivery to a factory, they may be stored out of doors in piles from 4 to 5 feet wide at the bottom, and covered lightly with straw and earth. The ridges of the piles should be left open for a few days to let the warm air escape. The yield varies from 5 to 10 tons of fresh roots per acre.

### Preparation of the Roots.

For the preparation of chicory the older, stout, white roots are selected, and after washing they are sliced up and dried in a kiln. In our hot summer, however, the drying can be performed by spreading the sliced roots on a canvas framework, covering them at night to protect them from dew. In two or three days they are dry enough to bag. There are several varieties of chicory, but the sorts generally used for mixing with coffee are Magdeburg, Brunswick, and Elite, the last-mentioned variety being similar to the large-rooted Brussels or "White Loof" variety. The latter has a thick, stubby root and is the most profitable to grow for manufacture.

### Marketing.

The chicory-grower can either sell the dried, sliced roots or he may roast them in a revolving iron cylinder. The loss in weight by this process is from 20 to 30 per cent. During the roasting, 2 lb. of lard should be added to every hundredweight of chicory to give it a lustre like that of coffee. The ground chicory looks like ground coffee and smells like liquorice. There is a good market for it both in Brisbane and the Southern States, and now that the devastation caused by the war has practically put an end to the cultivation of many crops, such as beetroots, chicory, flax, and others—in Belgium and France—it would seem that there is a good opportunity for Queensland farmers to enter upon chicory cultivation, and afterwards retain a business which cannot but be profitable.

Before the above calamitous war overtook France and Belgium, the price of Belgian chicory was £7 5s. per ton, f.o.b. Antwerp; to-day Dutch chicory, f.o.b. Dutch ports, is quoted at £16 per ton for the dried roots. The wholesale price to retailers of manufactured (*i.e.*, roasted and ground) chicory was £27 per ton, whilst now it is £45, and the price still rising. Here is a good opening for Queensland farmers to seize upon this industry and hold it for the future.

As to the prices for the dried root, Messrs. Harper and Co. and Messrs. Thurlow and Co. are purchasers of good samples of dried and cured chicory roots, at prices which should enable the grower to make a good profit on his crop. The seed may be obtained in Brisbane, and we understand that the price is 3s. per lb.

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## CRUSHING DATES—1915 SEASON.

The "Queensland Sugar Journal" states that the following mills will commence crushing on or about the under-mentioned dates:—

Moreton—end of July.
Victoria—about end of June.
Kalamia—about first week in August.
Pleystowe—about August.
Nerang—early in August.
Maryborough—end of August.
Marburg—middle of August.
Baffle Creek—early in July.
Waterloo—early in August.
Marian—about last week in July.
Hambledon—about end of July.
Invicta—well into August or beginning of September.

## THE LUCE CANE HARVESTER.

A little over a year ago (April, 1914) we published an account given in the "Louisiana Planter" of 6th December, 1913, of a cane harvester invented by Mr. George D. Luce, of New Orleans. About that time the machine was tried at the sugar experiment in Audubon Park on a crop estimated to yield 30 tons of cane per acre. The work done by this machine was so excellent as to "foreshadow the complete success of Mr. Luce along the lines which he has developed." At this trial

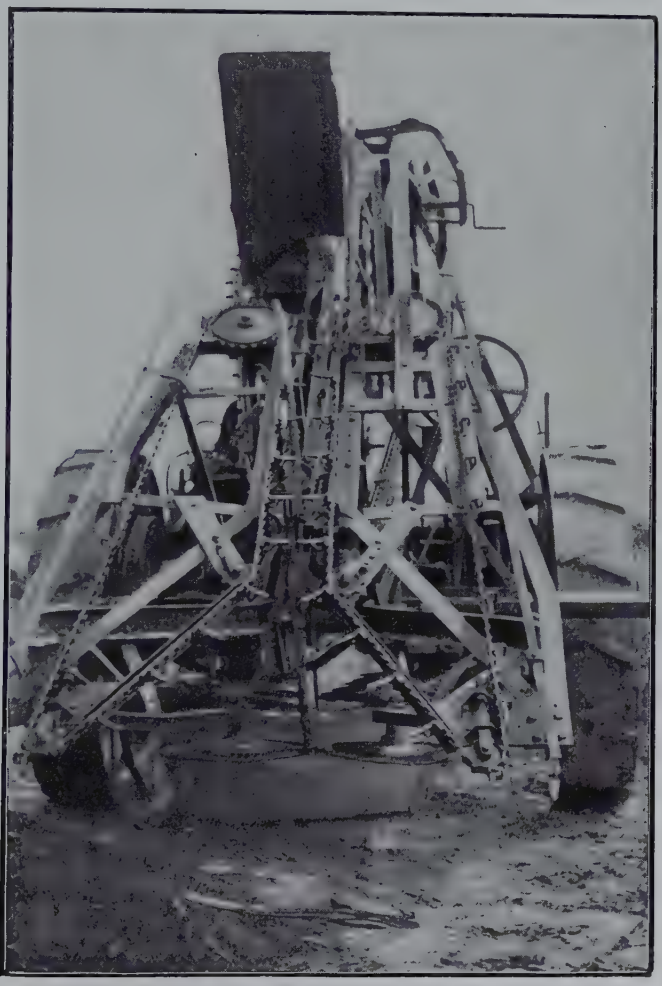

PLATE 28.—LUCE CANE HARVESTER, SHOWING PICK-UP CHAINS AND THE BOTTOM CUTTING DISCS.

the machine travelled a measured 42 feet in the 30-ton crop without any stopping. The "Planter" presumed that this was the first time that any sugar-cane harvester had accomplished that distance in heavy cane without a single stop. The machine is thus described in the above-named Journal:—

"Mr. Luce's machine weighs about 3¼ short tons. He believes that by gradual improvements this can be reduced to 1¾ short tons; but with

the weight of his present machine it made a surprising progress through the cane row.

"Mr. Luce has geared his cutting discs so that their movement makes sliding cuts on the cane, and not a direct, forcible cut, as is done with other disc machines. This may be one of the reasons of its successful traction in heavy cane.

"The cane where cut by the knives at the bottom is controlled by link belt chain guides that pick the cane up from close to the ground, as well as those that are standing vertically, and bring all of these canes in a vertical line to a point at which these guiding chains completely grasp the cane, holding it firmly in position. The stream of sugar-cane thus entering the machine enters at an angle established for the purpose, which, with some 5 or 6 feet of travel, carries the cane forward and upward until it strikes the top of the chute, when the firm grasp of the guide and feeding chains so hold the canes that the soft tops bend over,

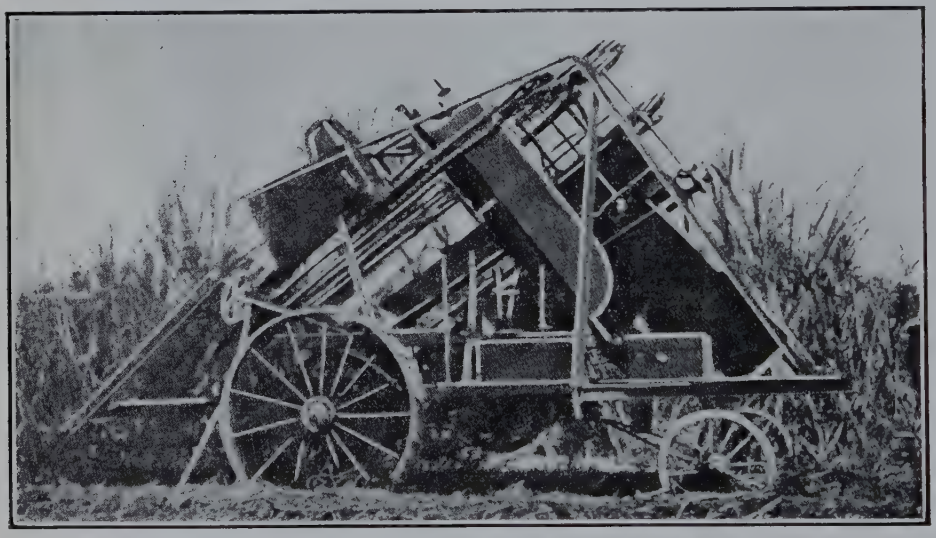

PLATE 29.—LUCE CANE HARVESTER IN THE FIELD.

sometimes breaking off, and at that point disc cutters are arranged so that all of the canes are cut at the desired point thus attained. It struck us that in this point Mr. Luce has made a wonderful display of inventive ingenuity, and it seems to be the solution of that most vexed problem of all, the cutting of the canes properly at the top. When we recognise the fact that our sugar-canes vary in length of ripe cane from 5 to 10 feet, more generally, say, from 5 to 8 feet, after the top is off, we can appreciate Mr. Luce's achievement. These canes thus topped have in the meantime been stripped by the spring whips that move in reverse direction from the movement of the cane.

### THE LUCE CANE HARVESTER.

"The final delivery of the canes is down an open chute, forming a continuous wind-row.

"We especially inquired as to any control of the cutting apparatus as to height. Ordinarily plant canes or highly fertilised canes might give canes varying from 6 to 10 feet in length, while stubble canes and canes less well fertilised might run from 5 to 7 feet in length. We noted at once that there was an arrangement to shift from one length to another, just as readily as an automobile may have its speed changed. This, however, still leaves the Luce machine cutting the cane at the last ripe joint, whether the canes be long or short, as the bending of the top of the cane becomes a gauge point to determine their approach to the cutting discs of the topping part of the machine. It is stated that Mr. Luce has expended 100,000 dollars (£20,000) in developing his machine up to its present condition."

In a notice of the machine in the April issue of the "Queensland Sugar Journal," that Journal says:—

"The Southern Pacific Company has been so impressed by the work of the machine at Clotilda that in preparing their exhibit for the San Francisco Exhibition, they have included some moving pictures of the Luce cane harvester. These pictures show the Luce harvester cutting cane that averaged 35 tons to the acre. In this cane, it was cutting, stripping, and topping the stalks satisfactorily at the rate of 200 tons per day.

"Generally speaking, the machine is a combination of tractor and harvester. That is to say, the machinery for harvesting the cane can be lifted off after the grinding season is over, and this leaves the rest of the machine in the form of a tractor, which may be used for ploughing, cultivating, road making and grading, and for other work about the plantation. Thus, the machine is an all-the-year-round worker.

"The 'tractor' part of the outfit runs on its own rails—or, in other words, the traction is of the caterpillar type, made world famous lately by the pictures of the big guns being used in the European war. This enables the machine to travel over ground which would be impassable for either mules or horses.

"The cane is severed much closer to the ground than is the case with hand cutting, an average of from 4 to 5 inches of the richest part of the cane being added to each available stalk, and the cut is clean and square. The topping is done by rapidly-revolving knives, and by a simple but ingenious device the stalks are topped accurately, whether they are of a uniform length or not.

"Stripping is done by flexible steel fingers attached to the edges of flat, slab-like shafts, and the construction of these shafts acts as a fan that clears the trash as it is stripped from the stalk.

"Fallen cane is picked up and brought against the cutting knives as though it had always been straight, and had never fallen. This, and the design of the cutting mechanism, is the reason for the machine's successful operation in heavy cane.

"Two men are required to operate the machine, which will cut, top, and strip from 150 to over 200 tons of cane per day. Those who

have to search out and pay the ever-elusive plantation labour, can easily figure how many men can be released from actual harvesting for other work about the plantation by the use of this machine."

The illustrations appeared in the "Louisiana Planter," the second of which has been kindly loaned to us by the Editor of the "Queensland Sugar Journal."

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## EXPERIMENTS IN THE DESTRUCTION OF THE CANE GRUB.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Entomologist, Mr. E. Jarvis:—

"In November last a sample of dichlorbenzole which was imported by the Department of Agriculture from Germany before the war broke out was forwarded to me by the Sugar Bureau for experimental purposes. After trials I am inclined to think that it possesses efficient though temporary deterrent qualities.

"The following details will illustrate some of the methods employed in this investigation:—As a preliminary test six grubs were confined in a closed cage holding 54 cubic inches of sifted soil, with which had been mixed 15 grains of the deterrent (1 oz. to 1 cubit foot). After two and a-half days all larvæ were dead and partially rotten. This experiment was repeated on three subsequent occasions with similar results. On 27th February eighteen large grubs were placed in an open cage containing 1 cubic foot of unsifted soil infected with half an ounce of coarsely crushed dichlorbenzole. Thirty-six hours later three had succumbed, and the remainder were lying motionless as though paralysed, all dying in less than a fortnight. Tests were then applied to determine the effect on larvæ of isolated injections of the chemical in uncrushed form, administered at various depths, and these trials proving satisfactory it was decided to experiment in the open. A plot of red volcanic soil was accordingly dug 9 in. deep, a row of four-months'-old cane-stools planted, and on 5th March the land treated with a series of ¼-oz. injections 1 ft. apart in a straight line on each side of stools, 6 in. from same, and 7 in. in depth. About fifty grubs were then placed a couple of inches below the surface above injections, and the ground left undisturbed for a fortnight. At the expiration of that period a faint odour of dichlorbenzole was perceivable in the soil at a distance of 15 in. from injections, and strongly impregnating to the full depth of digging a strip of land 2 ft. wide. Examination revealed the presence of a few dead grubs only, the living ones having evidently been driven from the infected area. The cane plants continued perfectly normal, and were rooting freely. With a view to determining the action of the chemical on larvæ compelled to remain under its influence, a plot of ground was prepared on 3rd April by being dug 9 in. deep, allowed to settle for a few days, and treated with a single line of ¼ oz. injections placed 1 ft. apart and 5 in. beneath the surface. Grubs of the grey-back cane-beetle were then buried in the soil at various distances from the chemical, each larva being confined in a specially designed cage that, whilst preventing extended movement in a horizontal

direction, allowed it to descend vertically to a depth of 9 in. or ascend to within an inch of the surface, and at the same time ensured continuous natural conditions with respect to drainage, moisture, temperature, &c. Examined on the 12th instant (nine days later), the soil was found more or less impregnated with the odour of the deterrent to a distance of 1 ft. on each side of injections. Larvæ placed at distances of 6 and 8 in. were dead and discoloured, those at 9 in. dying but able to move convulsively, and those 1 ft. away alive and apparently healthy. Grubs situated 9 in. from the chemical succumbed on the 18th instant (after fifteen days); whilst those 1 ft. distant, and control specimens, continued unaffected throughout the experiment. This test was repeated later with practically identical results; and further trials, in which the injections were reduced to 80 grains placed 1 ft. 6 in. apart, also proved satisfactory.

With reference to the rate of evaporation of dichlorbenzole, I observed that in dry weather a quarter of an ounce, after being fifteen days underground at a depth of 7 in., subjected to an average temperature of 69 degrees F., weighed 3 scruples 5 grains, thus indicating a loss of nearly 50 per cent., but did not actually disappear until the end of six weeks. Better results could doubtless be obtained from injections made of a single lump like a "moth-ball," as in this form the same amount of chemical might last two months or longer, and its application would be simplified. Under wet conditions both evaporation and soil infection were retarded.

It is worth noting, however, that the deterrent odour remained in the ground long after all traces of its origin have vanished. Soil under cane-stools treated 5th March was found to be strongly infected on the 8th of May, three weeks after complete evaporation, from which we may reasonably assume that a limited area of such contaminated soil—comprising, say, a strip at least a foot wide—would continue repellant until the odour became less decided.

Dichlorbenzole is sold in the form of irregularly-shaped crystalline nodules possessing a somewhat pungent odour not unlike that of benzine, and differs from napthalene in being semi-transparent, duller in colour, and not flaked.

It is unfortunate that this article is at present unprocurable. The price was stated to be 6d. per lb., and at this rate it would cost £1 10s. to treat an acre with injections of 80 grains placed 1 ft. 6 in. apart under each row of cane; or £2 4s. for the same number of ¼-oz. injections. Dichlorbenzole should also prove serviceable as a repellant against oviposition, it being exceedingly improbable that the adult beetle would either enter or deposit eggs in soil contaminated with an odour fatal to its offspring. This is likely to be matter of exceptional interest for future investigation.

This report has been made and the experiments undertaken as a matter of general interest to canegrowers, but other experiments may, of course, prove disappointing, in view of the fact that success will be dependent to some extent on varying conditions of porosity due to the physical composition of soils, and influenced by different modes of cultivation and drainage.

# Botany.

## PLANTS POISONOUS TO STOCK.

BY FRANK SMITH, B.Sc., F.I.C. AND C. T. WHITE.

**Dysphania myriocephala,** *Benth.* (N. O. Illecebraceæ).

The uncertainty in many instances attaching to the definite ascribing of poisonous properties to suspected plants is attributable to various causes—the frequent absence of correct diagnosis, the difficulty of determining the harmful individual in mixed pasture, and the variation in degree of toxiety at different stages of growth.

Uncertainty can be rendered certainty by two methods of attack—the experimental feeding of animals upon the suspected plant, or by establishing by chemical examination the presence therein of principles the physiological effect of which can be foretold.

Various specimens of the weed *Dysphania myriocephala* (N. O. Illecebraceæ), despite its close alliance to the wholesome amanths (Amarantaceæ) and salt bushes (Chenopodiaceæ), have been found by the writers to contain both an amount of hydrocyanic acid yielding substance (a glucoside) and an alkaloid. The former has the property of yielding on disintegration and destruction of the cells by the digestive apparatus the powerful poison hydrocyanic (prussic) acid; the latter, to which class the drugs strychnine, morphine, atropine belong, would undoubtedly exercise marked physiological effect. The plant is, therefore, to be regarded as a virulent stock poison. Indeed, this role has already been assigned it, as the following references will show:—

Bailey and Gordon, in "Plants Reputed Poisonous to Stock" (1887), write:—"A specimen of this plant was forwarded from the north-western portion of the Warrego district, where the drover in charge stated that he lost thirty rams out of a small flock, deaths taking place immediately after the first appearance of the symptoms."

In June, 1914, Mr. M. Hayward, manager of Comongin South, Thargomindah, forwarded specimens to the Colonial Botanist with the following remarks:—"I am sending for examination a sample of a plant which I have reason to believe poisoned eight head of cattle here. The cattle are all dead within a radius of 20 yards, and appear to have died without a struggle. There is a patch of weed on which they had been feeding right alongside them."

The weed is found chiefly in the inland portions of the State, and, despite a fairly wide occurrence, the writers are not aware of any local or common appellation. Its presence has also been noted in the Brisbane district, though whether native or introduced from some Western locality it is impossible to say, and quite recently it was observed growing in great profusion in a suburban fowl-run, strange to say practically the only green stuff left standing in the area.

A brief description of the plant, together with a plate, will aid in its identification.

*Dysphania myriocephala* is a small diffuse or procumbent herb with branching ascending stems rarely more than 6 or 7 inches high. It has numerous small linear leaves in the axils of which are borne the greenish flower clusters. The clusters of flowers are small and globular, each containing 10-20 or even more minute flowers, and often occupy the greater part of the plant. The seed is minute, ovoid, dark-coloured, and slightly flattened.

PLATE 30.—DYSPHANIA MYRIOCEPHALA, *Benth.*

# Entomology.

## A FRUIT FLY ATTACKING PAPAW FRUITS.

The "Agricultural News" of Barbados (27th March) contains the following article on the Papaw Fruit Fly, which was published in the "Journal of Agricultural Research" for 21st September, 1914, a journal issued by the U.S. Department of Agriculture:—

"The Papaya of the Southern United States is the West Indian Papaw (*Carica papaya*), and as this plant has some importance from an economic point of view in certain of these islands, a brief abstract of the paper mentioned above, which appears under the joint authorship of Messrs. Frederick Knab and W. W. Yothers, may be of interest to readers of the "Agricultural News."

"The insect which forms the subject of this paper is *Toxotrypana curvicauda*, Gerstaecker. It was first brought to the notice of the U.S. Department of Agriculture in 1905, when it was bred from a maggot-infested papaw fruit, from the Subtropical Plant Introduction Field Station at Miami, Florida. Since that time, the increasing importance of the papaw as a possible commercial crop has led to investigations in connection with this insect.

"The papaw fruit fly is now recorded as occurring in the southern part of Florida, in Costa Rica, Yucatan, Brazil, Peru, Porto Rico, Bahamas, and St. Jean (? St. Jan), Danish West Indies. It is stated that this last record has been erroneously given as St. John, Antigua.

"*Description—the Adult.*—The papaw fruit fly (*Toxotrypana curvicauda*) belongs to the dipterous family Trypetidæ, and exhibits a certain superficial resemblance to a common brown wasp (Polistes). This is due not only to its similarity of size, form, and general colouration, but in life this is accentuated by the manner in which it walks about on the fruit, with its body well elevated upon its slender legs, and by a certain nervousness of movement. The female is remarkable for its long and slender curved ovipositor, which exceeds the length of its body.

"*The Eggs.*—The eggs were procured from gravid females by dissection. The number of eggs produced by a single female appears to be slightly in excess of 100; the counts from two females, both showing a distended abdomen and probably containing a nearly full complement of eggs, gave 103 fully developed eggs in each case. No eggs in process of development were present, which indicates that all the eggs are disposed of within a short period.

"*The Larva.*—The larvæ are shining, dirty, greenish-white in colour while feeding upon the interior seed mass. Larvæ that have matured within the ripened fruit, and that have penetrated into the meat, are the same rich golden-yellow colour as the ripe fruit.

"*Habits of the Larvæ.*—The larvæ of the papaw fruit fly occur in the interior of the fruit, first feeding in the central seed mass, but later, as they mature and the fruit ripens, working into the meat and ruining the fruit. The number of larvæ in a single fruit varies from two or

three to twenty or more. Sometimes larvæ of different sizes occur in the same fruit at the same time, showing that the infestation was from more than one oviposition.

"Cultivated fruit has been found to be generally less infested than that growing wild, and this is ascribed to the fact that the flesh of the cultivated fruits is usually thicker, the thin-fleshed varieties appearing to be more generally attacked. It seems that the eggs are deposited inside the seed cavity, or at least the insects develop best when this happens. Thick-fleshed fruits often showed numerous scars, indicating attempts at oviposition, when no injury to the seed mass or the flesh occurred to indicate the feeding of the larvæ. On the other hand, fruits were noticed, in which fully-grown larvæ were found dead. This is explained as being the result of an attack on fruits which were too young. The contact with the juice of the unripe fruit is quickly fatal to the larvæ. It is evident that the fruit was too young when attacked, and that the maggots became fully grown and attempted to penetrate into the flesh before it was sufficiently ripened, and they were killed by contact with the juice. In the ripe fruit the flesh is softer, and the gummy juice is no longer exuded.

" *Pupal Period.*—The larvæ when full grown usually leave the fruit and fall to the ground, where they pupate, under some bit of rock or buried in the soil at a depth of 1 or 2 inches.

"The length of the pupal period is given as seventeen to twenty-one days in Porto Rico, and from thirty to forty-two days in Florida. The latter figures were obtained as the result of observations in the cool season of the year.

"*Habits of the Adult and Oviposition.*—The adults of this species appear only for a short time just before sunset. A female fly was observed to alight on a well-developed but unripe fruit. After walking about a little she inserted the ovipositor its full length into the fruit. As soon as the rind was punctured, the milky juice which the unripe fruit exudes whenever injured welled forth and began to trickle down over the surface. It is evident that the female fly endeavours to thrust her ovipositor through the flesh to deposit the eggs in the central seed cavity, and that it is only in those varieties with the thinner-fleshed fruit that this is successfully accomplished. The larvæ are always found in the seed mass, except when they are full grown and the fruit is ripe, when they penetrate into the flesh with the object of working their way to the outside in order to get to the ground and pupate.

"*Food Plants.*—Up to the present time no other fruit than the papaw has been recorded as being attacked by this insect, and all attempts to induce the larvæ to feed on other fruits have, so far, failed.

"*Rapid Increase of the Fruit Fly.*—During the last two years the papaw fruit fly has rapidly increased in abundance, and has extended its range so as to threaten seriously the future development of the papaw industry in Florida. This is largely a result of the increased cultivation of the papaw in the southern part of the State. Some varieties of Philippine stock producing large fruits are apparently free from attack.

"*Control.*—It has been pointed out that fruit with very thick meat escapes infestation. While the papaw fruit fly attempts to oviposit on such fruit, the thickness of the meat prevents the tip of the ovipositor from reaching the seed cavity, and in the meat itself the larvæ cannot live. It was further found that in some fruits the larvæ had reached maturity before these had ripened, and had been killed by the sticky juice of the green fruit in endeavouring to escape. The means of control that now seem valuable are the production of varieties of papaw that have thick meat and that ripen slowly, and the conscientious destruction of adventitious or wild papaw plants and of all infested fruits. All plants with inferior fruit should be eliminated."

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF APRIL IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING APRIL, 1915 AND 1914, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | | Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|---|---|---|---|---|
| | April. | No. of Years' Records. | April, 1915. | April, 1914. | | April. | No. of Years' Records. | April, 1915. | April, 1914. |
| *North Coast.* | In. | | In. | In. | *South Coast*—continued: | In. | | In. | In. |
| Atherton ... ... | 4·73 | 13 | 0·59 | 3·01 | | | | | |
| Cairns ... ... | 13·23 | 27 | 3·44 | 11·53 | Nanango ... ... | 1·98 | 27 | 0·96 | 0·94 |
| Cardwell ... ... | 9·94 | 27 | 4·33 | 7·04 | Rockhampton ... | 2·40 | 27 | 0·02 | 0·88 |
| Cooktown ... ... | 8·99 | 27 | 7·73 | 13·29 | Woodford ... ... | 4·09 | 27 | 2·15 | 0·51 |
| Herberton ... ... | 4·61 | 27 | 0·32 | 3·54 | Yandina ... ... | 4·55 | 21 | 2·67 | 3·31 |
| Ingham ... ... | 9·11 | 22 | 3·81 | 8·38 | | | | | |
| Innisfail ... ... | 23·44 | 27 | 9·15 | 22·29 | | | | | |
| Mossman ... ... | 16·78 | 5 | 2·48 | 13·01 | *Darling Downs.* | | | | |
| Townsville ... ... | 3·66 | 30 | 0·62 | 4·89 | | | | | |
| | | | | | Dalby ... ... | 1·56 | 27 | 0·44 | 0·86 |
| | | | | | Emu Vale ... | 1·21 | 17 | 0·79 | 1·08 |
| *Central Coast.* | | | | | Jimbour ... ... | 1·48 | 24 | 1·16 | 0·33 |
| | | | | | Miles ... ... | 1·47 | 27 | 0·96 | 2·65 |
| Ayr ... ... ... | 2·86 | 27 | 0·48 | 4·86 | Stanthorpe ... | 1·58 | 27 | 2·09 | 2·88 |
| Bowen ... ... | 2·82 | 27 | 0·69 | 3·18 | Toowoomba ... | 2·60 | 27 | 1·00 | 2·44 |
| Charters Towers ... | 1·90 | 27 | 0·67 | 2·64 | Warwick ... ... | 1·36 | 27 | 0·72 | 1·94 |
| Mackay ... ... | 6·33 | 27 | 2·10 | 4·98 | | | | | |
| Proserpine ... ... | 6·96 | 11 | 4·12 | 4·65 | | | | | |
| St. Lawrence ... | 2·91 | 27 | 0·06 | 1·48 | *Maranoa.* | | | | |
| | | | | | | | | | |
| | | | | | Roma ... ... | 1·27 | 25 | 0·98 | 1·88 |
| *South Coast.* | | | | | | | | | |
| | | | | | *State Farms, &c.* | | | | |
| Biggenden ... ... | 1·73 | 14 | 0·65 | 2·00 | | | | | |
| Bundaberg ... ... | 3·06 | 27 | 0·44 | 2·55 | | | | | |
| Brisbane ... ... | 3·62 | 64 | 2·41 | 0·42 | Gatton College ... | 1·84 | 14 | 1·38 | 1·53 |
| Childers ... ... | 2·52 | 19 | 0·11 | 0·87 | Gindie ... ... | 1·42 | 13 | 0·08 | 1·31 |
| Crohamhurst ... | 5·22 | 22 | 1·30 | 0·53 | Kamerunga Nurs'y | 13·03 | 23 | 3·52 | 9·06 |
| Esk ... ... ... | 2·65 | 27 | 1·91 | 1·85 | Kairi ... ... | 2·24 | 2 | 0·82 | 3·65 |
| Gayndah ... ... | 1·47 | 27 | 1·36 | 1·48 | Sugar Experiment | | | | |
| Gympie ... ... | 3·19 | 27 | 0·58 | 2·20 | Station, Mackay | 5·07 | 16 | 2·57 | 5·67 |
| Glasshouse M'tains | 4·52 | 6 | 3·19 | 0·79 | Bungeworgorai ... | Nil | Nil | ·50 | 1·74 |
| Kilkivan ... ... | 1·97 | 27 | 0·86 | 0·85 | Warren ... ... | ·1·19 | 2 | Nil | 2·38 |
| Maryborough ... | 3·35 | 27 | 1·01 | 2·00 | Hermitage ... | 1·32 | 7 | 0·80 | 2·03 |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for April this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

# General Notes.

## DRESSING FOR SEED WHEAT.

We have frequently given directions in this Journal for dressing seed wheat as a preventive of bunt or smut, but the pickling of the seed either with bluestone or formalin, followed by immersion in lime water, affords no protection against the depredations of birds. Although we are inclined to be sceptical as to the value of new patents, yet here is one we have just received from London which, under the name of "Corvusine," appears to have been largely used and much approved of by well-known farmers in England. It is claimed for this dressing that less seed can be sown per acre, that more vigorous plants are obtained, and, consequently, heavier crops, and that no birds or vermin will touch seed dressed with it, so that the whole of the seed sown is left to germinate, and two bushels per acre of reliable wheat are ample to produce a heavy and full crop. The cost of dressing wheat with Corvusine is stated to be 3d. per bushel, or 6d. per acre. Where birds have made vitriol-dressed wheat very thin in places, that dressed with this compound is said to be not touched by them. It does not injure the seed. In the case of maize, crows will wait till the green shoots appear, and then go down and play havoc with the plant. Neither fowls nor pigeons nor crows, it is claimed, will touch the seed once having tasted the grain. Should this be authenticated, as would appear by the testimonials in its favour, then the depredations of bandicoots in our Queensland maize fields would come to an end. The address of the proprietor, as stated on the circular we have received, is A. E. Hawker, 59 Mark Lane, London, E.C.

## DOGS IN WAR.

The following interesting note on the use of dogs in war time in France appeared in "Animalia" in the "British Live Stock Journal" for 26th February last:—

"Mr. Ian Malcolm, M.P. for Croydon, who for some months has been Director of the Wounded and Missing Department of the Red Cross Society, in a letter home states: 'There is a very interesting society in France, known as the "Ligue des Chiens Sanitaires," which trains dogs of all sorts, apparently, to carry despatches from one trench to another or to hunt for wounded men. They very kindly asked me to their training ground, and I am very glad that I went. There, in a large open space, were airedales, curly-coated sheepdogs, black Belgian collies (with a dash of the hyæna in them, I should say), and Scotch collies. They were all kennelled up and brought out one at a time for their lesson. In the field there were trenches and fences, pits and gravel mounds, obstacles of all kinds. The dogs were each at different stages of proficiency in the art of tracking wounded; some had begun learning that week; others

had been with the trainer for months, and one was a perfectly trained dog which the police had used for a couple of years.

'' The latter was a little wonder; he could climb wire netting or a stone wall like a cat, and he had the nose and pace of a first-class pointer. It was beautiful to see him work. A man goes by devious paths and ultimately hides in a pit enclosed in a 15-ft. wire cage, like the walls of an aviary without the roof. The dog is brought on the ground by his trainer, picks up the scent almost at once, and off he goes. Finally he reaches the pit, makes three springs up the fencing, finds the man, takes his cap, and races back to his master. He is then put on a leash, and off he goes again at full speed, dragging the man with him as fast as his legs can carry him over the broken ground until he reaches the wounded soldier, who is then tended, and, if possible, brought back to the nearest field hospital. These dogs, I believe, are in general use in the French and German armies, but hitherto I fancy that there are few, if any, among our British regiments. It would be an interesting experiment to try some among our troops, who could certainly work the dogs, if any soldiers in the world could.' ''

## INSURANCE OF CONTENTS OF STACKS.

Why do not some farmers insure their stacks? We hear constantly of stacks and haysheds, the latter often adjoining a shed containing valuable agricultural implements, being destroyed by fire, but no insurance. Yet it is so easy to calculate the content of a stack of any crop that the wonder is that some farmers will not insure their stacks, the premium being really a mere bagatelle, based on the content—not on the material, which may be lucerne or any other crop. Every farmer should know how to calculate the weight and consequent value of the stacked crop. There is no difficult arithmetical problem needed to arrive at this. Any 4th class schoolboy can work it out.

The weight of hay per cubic yard in the stack varies from 112 lb. to 300 lb., depending on the nature of the hay, its age, the size of the stack, and the part of the stack taken.

Take the conditions of hay and stacks, and the number of cubic yards to a ton will approximately vary as follows:—

| | Square Stacks. Cubic Yards. | Round Stacks. Cubic Yards. |
|---|---|---|
| If not well settled .. .. .. | 12 .. | 13 |
| If fairly well settled .. .. .. | 10 .. | 11 |
| If very compact .. .. .. | 8 .. | 9 |

If the reader will refer back to the Journals, vols. IV., X., XII., and XIX., he will there find simple directions for calculating the weight of hay in a stack, and, knowing that, he can effect an insurance at a small premium, which will ensure him against any loss by fire, such as occurs frequently in a dry season like the present. A wise farmer will insure not only his life and his house, but his crops, implements, and stock.

The following table shows the number of cubic yards in a ton at different weights per cubic foot:—

| Weight per Foot in lb. | | | Yards to a Ton. | | |
|---|---|---|---|---|---|
| 5·18 | equals | 16 | 7·50 | equals | 11 |
| 5·53 | „ | 15 | 8·25 | „ | 10 |
| 6·00 | „ | 14 | 9·18 | „ | 9 |
| 6·37 | „ | 13 | 10·31 | „ | 8 |
| 6·87 | „ | 12 | 11·85 | „ | 7 |

Having thus arrived at the weight of hay in the stack, and its market value, the owner can insure it at three-quarters of its estimated value.

## DANGER IN POISONED PRICKLY-PEAR.

A letter was lately received by the Under Secretary for Agriculture and Stock, from a settler who lost a cow owing to its having eaten poisoned prickly-pear. The pear had been poisoned about four or six months previously, and was so decayed that practically only the fibre was left. He believed the poison was either arsenic or cyanide, probably both. The symptoms are: Legs becoming suddenly powerless; frothing at the mouth; badly scoured; death ensuing with great agony in about twenty-four hours.

As more of the cows appeared to be infected, he applied to the Department for information as to any treatment which could be applied. The cattle were grazing on dry Rhodes grass and in green belar scrub.

The matter being urgent, the Veterinary Department promptly wired a recipe for arsenical poisoning. As this is a very important matter as possibly affecting stockowners in districts where the pear has been killed by the poison, we give the recipe.

The veterinary surgeon to whom the matter was referred was of opinion that the symptoms described all pointed to arsenical poisoning; he recommended that the following mixture be made up, and that one wineglassful be given in half a pint of cold water morning and night:—

Dissolve 2 oz. washing soda in 1 pint of boiling water; add 1 oz. of strong, liquid perchloride of iron, and allow to cool. This mixture is the antidote for arsenical poisoning.

## MEAD, OR HONEY BEER.

Boil 14 lb. of honey in 6 gallons of water for half an hour, breaking into it three or four new-laid eggs. Then add small bunches of flavouring from the garden, balm, thyme, &c., ½ oz. each of cinnamon, cloves, mace, and bruised ginger, and boil a quarter of an hour longer. Pour it out to cool, then toast a very large slice of bread of any kind, spread it over with fresh yeast, and put it into the liquor; let it ferment for a day, then put in the cask, but keep it open until the fermentation is complete. It may be bottled in a month, and the corks must be securely tied.—"Farm, Field, and Fireside."

## RATS ON PLANTATIONS.

"L.A.W.," writing on this subject to the "Journal of the Jamaica Agricultural Society," describes a remedy for rats, which was given to him by an old cacao planter at Fellowship, who, he says, "informed me that seven years ago rats and rat bats played fits with his cocoa, and he tried the following experiment. Result, no rats or rat bats had come back again for seven years past. I being sceptical, he got a bit worked up and offered to bet £100 on the results, saying the rats would run from Fellowship to Moore Town and never return.

"The scheme is to build one or more wood fires ready for lighting on the windward side of the cocoa walk or cocoa field. At dusk on an evening with a steady breeze blowing, light same and throw on them 3d. frankincense, 3d. brimstone, 3d. sulphur, 3d. myrrh, the fancy ingredients, I suppose, and one quart of bird pepper, the real obeah. Then clear out or you repent it, and leave the rats and bats to enjoy the incense prepared for them. Results, he claimed, are exodus of rats and bats never to return. The question is, Is there anything in it? Three years ago cockroaches got into my new piano and began to make hay. I set some phosphorous paste and killed sixteen. From that day to this, three years, I have never seen one back in it. The news has been passed to the cockroach community that my piano is a bad place. If roaches have so much sense, what about rats? What price a trial?"

## TO KEEP MICE FROM WHEAT BAGS.

Many farmers experience great difficulty in keeping their wheat bags free from the depredations of mice and rats, and the remedies tried are innumerable. A New South Wales farmer now states that if each of the bags is rubbed over with a few handfuls of sulphur, mice will never touch them, and the same procedure would probably answer in the case of rats. Bags thus treated have stood from stripping to sowing without a hole having been made in one of them.—"Pastoral Review."

## GELIGNITE.

For the information of farmers and others who use explosives either for clearing or for subsoiling, Mr. J. B. Henderson, Chief Inspector of Explosives, states that, if gelignite is stored in a very damp box it would probably get into a dangerous condition. The moisture tends to drive the liquid nitro-glycerine out of the bulk of the explosive on to the paper wrapper, where it is distinctly visible. Crystals of saltpetre also tend to form on the outside of the wrapper when moisture affects the explosive. Unless there is some visible change of this kind, there is no other change likely to have occurred. Mr. Henderson, however, points out that explosives should be kept strictly under the provisions of "*The Explosives Act of* 1906" and Regulations of 1908, and, if kept in a permitted magazine, are not likely to get damp.

## REMEDY FOR ZAMIA POISONING.

For cattle suffering from ricketts as the result of feeding on the zamia plant, the following remedy is recommended by the veterinary officers of the Department of Agriculture and Stock:—

Give 1 lb. Epsom salts in 1 quart tepid water, and follow twice daily with 2 drachms iodide of potassium in 1 pint of water.

## GOOD GRASSES FOR DAIRYING.

Rhodes grass is recommended by Mr. Brooks, Agricultural Instructor, for the drier portions of a district, and West African Wonder (*Panicum muticum*) for low-lying situations. The latter is propagated by cuttings. It may be pointed out that the feeding value of paspalum can be vastly increased by a mixture of white clover, more especially during the winter months.

## MORTALITY AMONGST YOUNG PIGS.

A correspondent lately wrote to this Department describing certain symptoms amongst his young pigs which resulted during six months in the death of twenty. The principal symptom was a dragging of the hind legs, when they lay about unable to rise but yet not going off their feed for two or three months before dying.

The case was submitted to one of the Government veterinary surgeons, who stated that the trouble was due either to rheumatism or worms in the kidney. If from the first cause, the animals should be kept dry, and away from draughts. A wooden floor should be placed about 1 foot from the ground, so that the animals would be kept comfortable. If from the second cause, 2 drs. of turpentine and 1 pint of sweet milk should be given daily for a week.

## ANTIDOTE FOR ARSENICAL POISONING.

Dissolve 2 oz. washing soda in 2 oz. boiling water; filter same through a piece of blotting paper; then add 1 oz. strong perchloride of iron; and give half this dose morning and night.

# Answers to Correspondents.

H. E. A. MINCHIN, Warrawoona, Evelyn—

The following answers to your various questions were given by the respective officers of the Department to whom they were submitted:—

Government Entomologist and Vegetable Pathologist (Mr. H. Tryon).—

*Q.* Can arsenate of lead be mixed with Bordeaux mixture?

*A.* Yes.

*Q.* Does arsenate of lead keep indefinitely?

*A.* This depends if kept away from chemicals that reaction it, but it is naturally a very stable compound.

Architect and Surveyor (Mr. A. Morry).—

*Q.* How should a varnish brush be kept?

*A.* Varnish brushes, when in constant use, should be kept from the air; they should not be left in the varnish during prolonged interruptions to work, but should be suspended in water, turpentine, or in kerosene, the bristles only being submerged without resting on the bottom, to prevent them turning up at the ends.

When work is finished, they should be carefully washed in soap and hot water if oil varnish, in turpentine or kerosene if spirit varnish, dried and put away. If not perfectly cleaned, oxidation takes place through exposure to the air, and the bristles are spoiled for future use. If brushes have become hard, wash them in hot turpentine in a frying-pan over a stove, or soak for some time in kerosene.

*Q.* Is there any way of preparing glue so that veneer work, &c., will not come apart in damp weather?

*A.* Glue may be made waterproof by mixing with it about 1 per cent. of bichromate of potash, which is 1 oz. to 6¼ lb. of glue. The bichromate should be dissolved in hot water, and the glue boiled in same. Too much bichromate will make it a yellow colour, and will not be effective; try half the quantity first and increase if necessary.

Poultry Expert, Gatton College (Mr. Hindes).—

*Q.* *Re* the shedding system of keeping hens: Does the thick layer of fresh horse dung effectively and healthfully do away with all smell and unpleasantness from the hens' droppings? What substitute could be used for this purpose in a place where fresh horse dung could not be obtained in a sufficient quantity?

*A.* There will be no bad smell for the first month; as soon as there is, the horse manure should be cleaned out and fresh material put in. Any rough grass or straw can be used instead of horse manure.

*Q.* *Re* "Hogan" system of poultry keeping: Could you furnish me with any details as to this (and others) intensive system?

*A.* The "Hogan" system is a secret for testing laying pullets, and can be purchased from any of his agents; it has nothing to do with intensive or any other system of poultry keeping. The method of carrying out the "Hogan" test can be bought from the "Poultry Bulletin," 200 Castlereagh street, Sydney, N.S.W. I have had no practical experience with any intensive system. There is a "Gordon" system (intensive), also a secret, which is sold by Mr. F. E. A. Gordon, care of G.P.O., Brisbane.

*Q.* What is the next best substitute for wheat as a poultry food?

*A.* Good heavy short oats, maize, barley, Kaffir corn, peas. Feed any of the above that may be procurable, giving as much variety as possible.

Agricultural Chemist (Mr. J. C. Brünnich).—

*Q.* Can laundry water containing soap and washing soda be safely used to water plants? If not, is there any inexpensive corrective?

*A.* Such water should not be used, or only very sparingly. There is no simple chemical corrective.

*Q.* Can laundry water containing soap and borax be safely used to water plants? If not, is there any inexpensive corrective?

*A.* The previous answer applies also to this question.

*Q.* Can "blue" water from a laundry be safely used to water plants? If not, is there any inexpensive corrective?

*A.* Yes, can be used.

*Q.* Why is rain so much more beneficial than irrigation? Does rain contain any appreciable amount of ammonia? To what extent can the spray systems of irrigation be compared with rain, especially as regards aeration?

*A.* The difference is partially due to considerable amounts of nitrogenous compound in rain water. It is not the aeration which would make the difference; even spray irrigation will not replace rain.

## INDIGESTION IN COWS.

Indigestion and scours may be due to the nature of the pastures. When the disorder is first noticed, ½ lb. Epsom salts should be given, followed daily with ½ oz. prepared chalk. This can be had from any chemist.

There is no cure for hair balls in calves.

## RICE HULLER.

"LUXMI," Cairns—

The "Luxmi" rice huller is made by Messrs. Ruston, Procter, and Co., Ltd., Lincoln, England. The weight of the machine is 5 cwt. It is guaranteed to deliver thirty bags of clean white rice in ten hours. In actual work in India, one of these machines is said to have turned out sixty bags in ten hours. We cannot tell you the price of the machine, but advise you to communicate with the makers.

## SUNFLOWER CULTIVATION.

M.A.F., Kaimkillenbun.

With further reference to your letter of 26th April on the subject of Sunflower-growing, the Department has now a pamphlet on Sunflowers in the press, which will shortly be available. Meanwhile, for your information, Messrs. Chas. Taylor, seed merchants, Roma street, Brisbane, are purchasers of seed. We advise that you write to them as to price, &c. The seed runs from 30 to 35 lb. per bushel.

## WORMS IN COW'S PAUNCH.

A correspondent at Mount Garnet writes describing a worm about half an inch long which, during very dry weather, appears in the honeycomb part of the paunch of many cattle, and asks for a remedy.

Two oz. oil of turpentine in 1 pint of raw linseed oil should be given on an empty stomach, followed daily with a powder consisting of 2 drs. sulphate of iron and 4 drs. powdered gentian. This should be given in a bottle of gruel, and the treatment continued for a week.

## SPRAY WASH FOR VEGETABLES.

"SPRAY," Tiaro—

The spray mentioned by you was published in this Journal in May, 1903. As it is possible that you may not have been a subscriber at that date, we again give it:—

The spray, or wash rather, was declared by Mr. S. C. Voller, then Assistant Instructor in Fruit Culture to the Department of Agriculture in this State, to be an infallible means of destroying aphis and other insect life on vegetables. The trouble with Paris green is, that it will not stick to the glossy leaves of cabbages and cauliflowers, but collects at the base of the stalk and at the junction of the stalk and leaves. Sprays are open to the same objection. The following wash, however, will stick like varnish, and in an instant destroy all animal life on the plants:—

Take 20 lb. of resin, 4 lb. caustic soda (98 per cent.), or 6 lb. (70 per cent.), 3 pints of fish oil or 2½ lb. whale oil soap, and 140 to 150 gallons of water. Place all the above ingredients in a boiler with 20 gallons of the water, and let the whole simmer for three hours. Then add hot water slowly, and stir well till there are at least 40 gallons of solution. Then add cold water to make up the 140 or 150 gallons. Never add cold water when cooking. This wash, using only 80 gallons of water, will destroy the mussel, glover, and white scales on citrus trees, and the mussel scale of the apple.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR MAY, 1915.

| Article. | | MAY. Prices. |
|---|---|---|
| Bacon | lb. | 9½d. to 11½d. |
| Bran (Mill price) | ton | ... |
| Butter | cwt. | 194s. |
| Chaff, Mixed | ton | £7 5s. to £8 10s. |
| Chaff, Oaten | „ | £6 to £10 |
| Chaff, Lucerne | „ | £6 5s. to £8 |
| Chaff, Wheaten | „ | £4 to £4 10s. |
| Cheese | lb. | 1s. |
| Flour | ton | ... |
| Hams | lb. | 1s. 1d. |
| Hay, Oaten (Victorian) | ton | £15 |
| Hay, Lucerne (Prime) | „ | £6 5s. to £7 |
| Honey | lb. | 3d. to 3½d. |
| Maize | bush. | 5s. 3d. to 5s. 4d. |
| Oats | „ | 6s. 6d. |
| Onions | ton | £8 10s. to £9 |
| Peanuts | lb. | 2½d. to 3d. |
| Pollard (Mill price) | ton | ... |
| Potatoes | „ | £5 to £7 10s. |
| Potatoes (Sweet) | cwt. | 4s. |
| Pumpkins | ton | £4 to £5 |
| Eggs | doz. | 1s. 6d. to 2s. 6d. |
| Fowls | pair | 2s. 6d. to 4s. 3d. |
| Ducks, English | „ | 3s. |
| Ducks, Muscovy | „ | 3s. 6d. to 4s. 6d. |
| Turkeys (Hens) | „ | 5s. to 6s. |
| Turkeys (Gobblers) | „ | 7s. to 12s. 6d. |
| Wheat (Seed) | bush. | 7s. to 7s. 6d. |

### VEGETABLES.

| | | |
|---|---|---|
| Cabbages | per dozen | 5s. to 7s. |
| Peas | per sugar bag | 4s. to 6s. |
| Beans | „ „ | 4s. to 7s. 6d. |
| Parsnips and Carrots | per dozen bunches | 9d. to 1s. |
| Cucumbers | per dozen | 9d. to 1s. 6d. |
| Custard Marrows | „ | 3s. 6d. to 5s. |
| Vegetable Marrows | „ | 3s. 6d. to 5s. |
| Beetroot | per dozen bunches | 8d. to 1s. |
| Chocos | per quarter-case | 1s. 6d. to 2s. 1d. |
| Sweet Potatoes | per cwt. | 2s. 6d. |
| Table Pumpkins | per dozen | 5s. |
| Tomatoes | per quarter-case | 3s. to 4s. 6d. |
| Lettuces | per dozen | 9d. to 1s. |

## SOUTHERN FRUIT MARKETS.

| Article. | MAY. Prices. |
|---|---|
| Bananas (Queensland), per case | 12s. to 15s. |
| Bananas (Fiji), per case | 21s. |
| Bananas (G.M.), per case | 14s. to 18s. |
| Mandarins | 5s. to 9s. |
| Oranges (Navel), per case | 7s. to 10s. |
| Oranges, Italian, per case | ... |
| Oranges (Other), per case | 5s. to 6s. |
| Passion Fruit, per half-case | 1s. to 4s. 6d. |
| Papaw Apples, per half-case | ... |
| Pineapples (Queens), per case | 9s. to 12s. |
| Pineapples (Ripleys), per case | 8s. to 12s. |
| Pineapples (Common), per case | 8s. to 10s. |
| Tomatoes, per half-case | 3s. 6d. to 5s. 6d. |
| Persimmons, per half-case | ... |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | MAY. Prices. |
|---|---|
| Apples (American), Eating, per case | 7s. to 8s. 6d. |
| Apples (Local), per case | 6s. to 7s. |
| Apples, Cooking, per case | 6s. to 9s. |
| Bananas (Cavendish), per dozen | 2½d. to 4½d. |
| Bananas (Sugar), per dozen | 3d. to 4d. |
| Cocoanuts, per sack | 12s. to 15s. |
| Custard Apples, per quarter-case | 3s. to 4s. |
| Lemons (Local), per case | 2s. to 5s. |
| Lemons (Italian), per case | .. |
| Mandarins (Northern), per case | 3s. to 3s. 6d. |
| Oranges (other), per case | 2s. 3d. to 3s. |
| Papaw Apples, per quarter case | 1s. 6d. to 3s. 6d. |
| Passion Fruit, per quarter-case | 2s. to 4s. |
| Peanuts, per pound | 2½d. to 3d. |
| Pears (Victorian), per case | 6s. to 10s. |
| Rosellas, per sugar bag | 1s. 6d. to 3s. |
| Pineapples (Ripley), per case | 7s. to 8s. 6d. |
| Pineapples (Rough), per dozen | 2s. to 3s. 6d. |
| Pineapples (Smooth), per dozen | 5s. to 6s. |
| Tomatoes, per case | 1s. 6d. to 5s. |

## TOP PRICES, ENOGGERA YARDS, APRIL, 1915.

| Animal. | APRIL. Prices. |
|---|---|
| Bullocks | £13 7s. 6d. to £16 10s. |
| Cows | £10 15s. to £12 7s. 6d. |
| Merino Wethers | 22s. 9d. |
| Crossbred Wethers | 23s. |
| Merino Ewes | 18s. 3d. |
| Crossbred Ewes | 25s. 3d. |
| Lambs | 21s. |
| Pigs (Porkers) | 45s. |

# TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

COMPUTED BY D. EGLINTON, F.R.A.S.

| Date. | MAY. | | JUNE. | | JULY. | | AUGUST. | |
|---|---|---|---|---|---|---|---|---|
| | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·14 | 5·17 | 6·31 | 5·0 | 6·39 | 5·3 | 6·30 | 5·18 |
| 2 | 6·14 | 5·16 | 6·31 | 5·0 | 6·39 | 5·3 | 6·30 | 5·18 |
| 3 | 6·15 | 5·15 | 6·32 | 5·0 | 6·39 | 5·3 | 6·29 | 5·19 |
| 4 | 6·15 | 5·14 | 6·32 | 5·0 | 6·40 | 5·4 | 6·28 | 5·20 |
| 5 | 6·16 | 5·13 | 6·33 | 4·59 | 6·40 | 5·4 | 6·27 | 5·21 |
| 6 | 6·17 | 5·12 | 6·33 | 4·59 | 6·40 | 5·4 | 6·27 | 5·21 |
| 7 | 6·17 | 5·12 | 6·34 | 4·59 | 6·40 | 5·5 | 6·26 | 5·21 |
| 8 | 6·18 | 5·11 | 6·34 | 4·59 | 6·40 | 5·5 | 6·25 | 5·22 |
| 9 | 6·18 | 5·11 | 6·34 | 4·59 | 6·40 | 5·5 | 6·24 | 5·22 |
| 10 | 6·19 | 5·10 | 6·35 | 4·59 | 6·40 | 5·6 | 6·24 | 5·22 |
| 11 | 6·19 | 5·10 | 6·35 | 4·59 | 6·39 | 5·6 | 6·23 | 5·23 |
| 12 | 6·20 | 5·9 | 6·35 | 4·59 | 6·39 | 5·6 | 6·23 | 5·23 |
| 13 | 6·20 | 5·9 | 6·35 | 4·59 | 6·39 | 5·7 | 6·22 | 5·24 |
| 14 | 6·20 | 5·8 | 6·36 | 4·59 | 6·39 | 5·7 | 6·21 | 5·25 |
| 15 | 6·21 | 5·8 | 6·36 | 5·0 | 6·38 | 5·8 | 6·20 | 5·26 |
| 16 | 6·21 | 5·7 | 6·36 | 5·0 | 6·38 | 5·8 | 6·19 | 5·26 |
| 17 | 6·22 | 5·6 | 6·37 | 5·0 | 6·38 | 5·9 | 6·18 | 5·26 |
| 18 | 6·22 | 5·5 | 6·37 | 5·0 | 6·37 | 5·10 | 6·17 | 5·27 |
| 19 | 6·23 | 5·5 | 6·37 | 5·0 | 6·37 | 5·11 | 6·16 | 5·27 |
| 20 | 6·23 | 5·4 | 6·38 | 5·0 | 6·36 | 5·12 | 6·15 | 5·27 |
| 21 | 6·24 | 5·4 | 6·38 | 5·0 | 6·36 | 5·12 | 6·14 | 5·28 |
| 22 | 6·24 | 5·4 | 6·38 | 5·0 | 6·36 | 5·12 | 6·13 | 5·28 |
| 23 | 6·25 | 5·3 | 6·38 | 5·0 | 6·35 | 5·13 | 6·12 | 5·29 |
| 24 | 6·25 | 5·3 | 6·38 | 5·1 | 6·35 | 5·13 | 6·11 | 5·29 |
| 25 | 6·26 | 5·3 | 6·39 | 5·1 | 6·35 | 5·13 | 6·10 | 5·30 |
| 26 | 6·26 | 5·2 | 6·39 | 5·1 | 6·34 | 5·14 | 6·9 | 5·30 |
| 27 | 6·27 | 5·2 | 6·39 | 5·2 | 6·34 | 5·14 | 6·8 | 5·31 |
| 28 | 6·28 | 5·2 | 6·39 | 5·2 | 6·33 | 5·15 | 6·7 | 5·31 |
| 29 | 6·29 | 5·1 | 6·39 | 5·2 | 6·32 | 5·16 | 6·6 | 5·32 |
| 30 | 6·30 | 5·1 | 6·39 | 5·3 | 6·31 | 5·17 | 6·5 | 5·32 |
| 31 | 6·30 | 5·1 | ... | ... | 6·31 | 5·17 | 6·5 | 5·33 |

## PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 6 May | ☽ | Last Quarter | 3 | 22 | p.m. |
| 14 „ | ● | New Moon | 1 | 31 | „ |
| 22 „ | ☾ | First Quarter | 2 | 50 | „ |
| 29 „ | ○ | Full Moon | 7 | 33 | a.m. |

The moon will be at its brightest not only when full, but because it will this month be at its least distance from the earth at that time.

| | | | | | |
|---|---|---|---|---|---|
| 5 June | ☽ | Last Quarter | 2 | 32 | a.m. |
| 13 „ | ● | New Moon | 4 | 57 | „ |
| 21 „ | ☾ | First Quarter | 12 | 24 | „ |
| 27 „ | ○ | Full Moon | 2 | 27 | p.m. |

The moon will be at its greatest distance from the earth on 11th June at 10 a.m., and nearest on the 26th at midday.

| | | | | | |
|---|---|---|---|---|---|
| 4 July | ☽ | Last Quarter | 3 | 54 | p.m. |
| 12 „ | ● | New Moon | 7 | 30 | „ |
| 20 „ | ☾ | First Quarter | 7 | 9 | a.m. |
| 26 „ | ○ | Full Moon | 10 | 11 | p.m. |

The moon will be at its greatest distance from the earth on 8th July, about 9 p.m., and at its nearest on the 24th at 3·24 p.m.

| | | | | | |
|---|---|---|---|---|---|
| 3 Aug. | ☽ | Last Quarter | 7 | 27 | a.m. |
| 11 „ | ● | New Moon | 8 | 52 | „ |
| 18 „ | ☾ | First Quarter | 12 | 17 | p.m. |
| 25 „ | ○ | Full Moon | 7 | 40 | a.m. |

The moon will be at its greatest distance from the earth on 5th August at 36 minutes after 12, midday, and at its nearest on the 20th about midnight.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes, respectively, later than at Brisbane.

At Roma the times of sunrise and sunset during May, June, July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given for Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

[All the particulars given on this page were computed by D. Eglinton, F.R.A.S., and should not be reproduced in local newspapers without acknowledgment.]

# Farm and Garden Notes for July.

FIELD.—The month of July is generally considered the best time to sow lucerne, for the reason that the growth of weeds is then practically checked, and the young lucerne plants will, therefore, not be checked by them, as would be the case if planted later on in the spring. If the ground has been properly prepared by deep ploughing, cross-ploughing, and harrowing, and an occasional shower occurs to assist germination and growth, the lucerne will thrive so well that by the time weeds once more appear it will be well able to hold its own against them. From 10 to 12 lb. of seed drilled, or 15 to 16 lb. broadcast, will be sufficient for an acre. This is also the time to prepare the land for many field crops, such as potatoes, maize, oats, and barley for green fodder; also, rye, vetches, tobacco, cotton, sugar-cane, field carrots, mangolds, swedes, canaigre, &c. Early potatoes, sugar-cane, and maize may be planted in very early districts, but it is risky to plant potatoes during this month in any districts liable to late frosts or in low-lying ground. Under such conditions, it is far better to wait until well into the following month. The greatest loss in potatoes and sugar-cane has been, on more than one occasion, experienced in September, when heavy frosts occurred in low-lying districts in the Southern portion of the State. During suitable weather, rice may be sown in the North. The coffee crop should now be harvested, and yams and turmeric unearthed.

KITCHEN GARDEN.—Should showery weather be frequent during July, do not attempt to sow seeds on heavy land, as the latter will be liable to clog, and hence be injurious to the young plants as they come up. The soil should not be reworked until fine weather has lasted sufficiently long to make it friable. Never walk over the land during wet weather with a view to sowing. The soil cakes and hardens, and good results cannot then be expected. This want of judgment is the usual cause of hard things being said about the seedsman. In fine weather, get the ground ploughed or dug, and let it lie in the rough till required. If harrowed and pulverised before that time, the growth of weeds will be encouraged, and the soil is deprived of the sweetening influences of the sun, rain, air, and frost. Where the ground has been properly prepared, make full sowings of cabbage, carrot, broad beans, lettuce, parsnips, beans, radishes, leeks, spring onions, beetroot, eschalots, salisify, &c. As westerly winds may be expected, plenty of hoeing and watering will be required to ensure good crops. Pinch the tops of broad beans which are in flower, and stake up peas which require support. Plant out rhubarb, asparagus, and artichokes. In warm districts, it will be quite safe to sow cucumbers, marrows, squashes, and melons during the last week of the month. In colder localities, it is better to wait till the middle or end of August. Get the ground ready for sowing French beans and other spring crops. Sow Guada beans (snake gourd) at the end of September.

FLOWER GARDEN.—Winter work ought to be in an advanced state. The roses will now want looking after. They should already have been pruned, and now any shoots which have a tendency to grow in wrong directions should be rubbed off. Overhaul the ferneries, and top-dress with a mixture of sandy loam and leaf mould, staking up some plants and thinning out others. Treat all classes of plants in the same manner as the roses where undesirable shoots appear. All such work as trimming lawns, digging beds, pruning, and planting should now be got well in hand. Plant out antirrhinums, pansies, hollyhocks, verbenas, petunias, &c., which were lately sown. Sow zinnias, amaranthus, balsam, chrysanthemum tricolor, marigolds, cosmos, coxcombs, phloxes, sweet peas, lupins, &c. Plant gladiolus, tuberoses, amaryllis, pancratium, ismene, crinums, belladonna, lily, and other bulbs. Put away dahlia roots in some warm, moist spot, where they will start gently and be ready for planting out in August and September.

# Orchard Notes for July.

## THE SOUTHERN COAST DISTRICTS.

The notes for the month of June apply to July as well. The first crop of strawberries will be ripening during the month, though extra early fruit is often obtained in June, and sometimes as early as May, under especially favourable conditions. Look out for leaf-blight, and spray for same with Bordeaux mixture, also watch for the first signs of the grey mould that attacks the fruit, and spray with the sulphide of soda wash. The larvæ of the cockchafer, that eats the roots of strawberries, should be looked for, and destroyed whenever found. Pruning of citrus and other fruit trees may be continued; also, the spraying with lime and sulphur. Where the ringing borer, that either attacks the main trunks or the branches at or near where they form the head of the tree, is present, the main stems and trunks should either be painted or sprayed with the lime and sulphur wash during the month, as the mature beetles that lay the eggs that eventually turn to the borers sometimes make their appearance during the month, and unless the trees are protected by the wash they lay the eggs, which hatch out in due course and do a lot of damage. Keep the orchard clean, so that when the spring growth takes place the trees may be in good condition. There is usually a heavy winter crop of pineapples ripening during this and the following month, particularly of smooth leaves. See that any conspicuous fruits are protected by a wisp of grass, as they are injured not only by frost but by cold westerly winds.

## THE TROPICAL COAST DISTRICTS.

See the instructions given for the month of June. Keep the orchards clean and well worked. Prune and spray where necessary.

## THE SOUTHERN AND CENTRAL TABLELANDS.

Where pruning of deciduous trees has not been completed, do so this month. It is not advisable to leave this work too late in the season, as the earlier the pruning is done after the sap is down the better the buds develop—both fruit buds and wood buds; thus securing a good blossoming and a good growth of wood the following spring.

Planting can be continued during the month; if possible, it should be finished this month, for though trees can be set out during August, if a dry spell comes they will suffer, when the earlier planted trees, which have had a longer time to become established, will do all right—provided, of course, that the land has been properly prepared prior to planting, and that it is kept in good order by systematic cultivation subsequent to planting.

Do not neglect to cut back hard when planting, as the failure to do so will result in a weakly growth.

As soon as the pruning is completed, the orchards should get their winter spraying with the sulphur limewash, and either with or without salt, as may be wished. See that this spraying is thoroughly carried out, and that every part of the tree is reached, as it is the main treatment during the year for San José and other scale insects, as well as being the best time to spray for all kinds of canker, bark-rot, moss, lichens, &c.

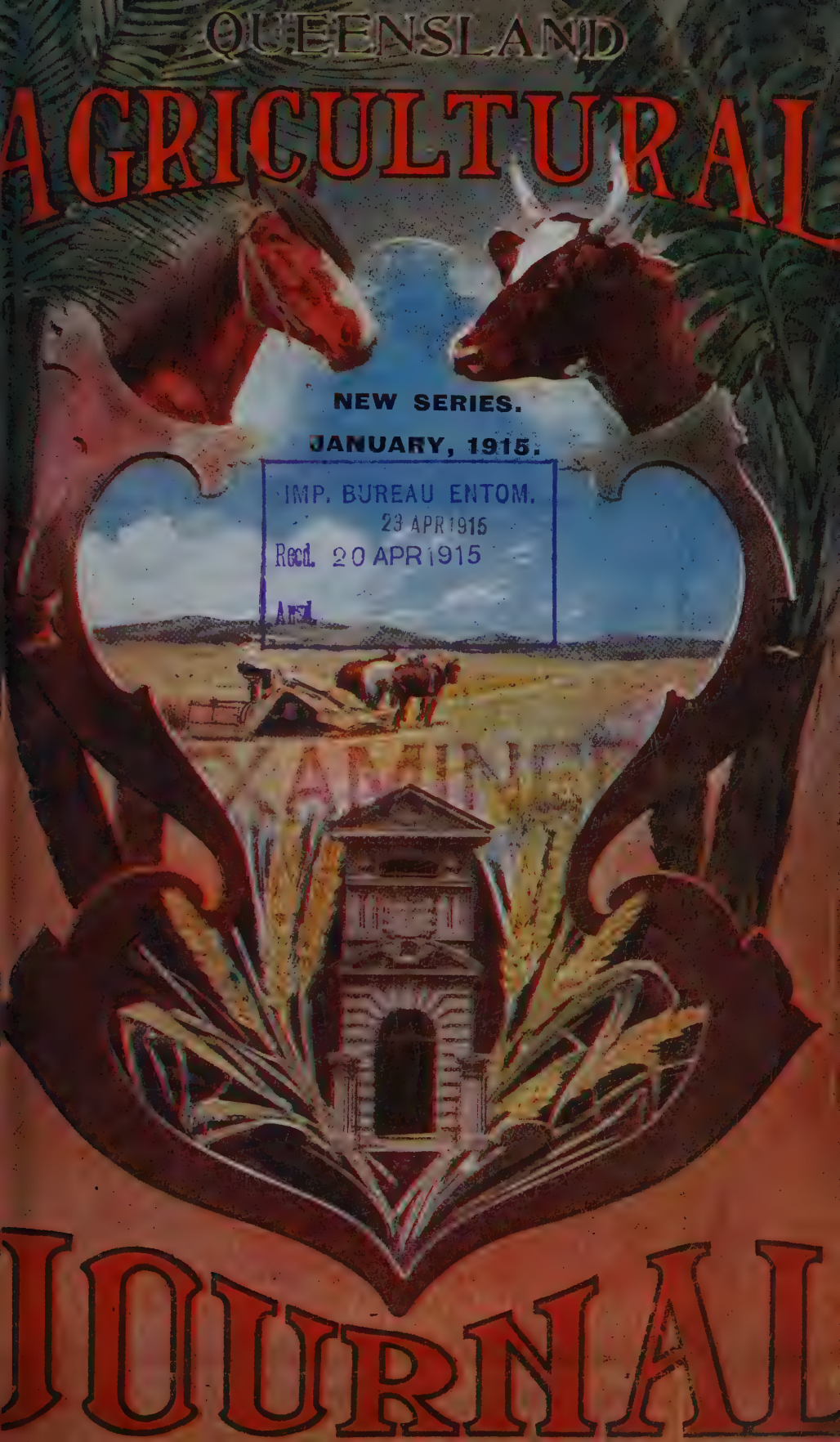
Where the orchard has not been ploughed, get this done as soon as the pruning and spraying are through, so as to have the land in good order for the spring cultivations. See that the work is well done, and remember that the best way to provide against dry spells is to keep moisture in the soil once you have got it there, and this can only be done by thorough and deep working of the soil.

When obtaining trees for planting, see that they are on good roots, and that they are free from all pests, as it is easier to prevent the introduction of pests of all sorts than to eradicate them once they have become established. Only select those varieties that are of proved merit in your district; do not plant every kind of tree that you see listed in a nurseryman's catalogue, as many of them are unsuited to our climate. The pruning of grape vines may be carried out in all parts of the tablelands other than the Stanthorpe district, where it is advisable to leave this work as long as possible, owing to the danger of spring frosts.

Where grape vines have been well started and properly pruned from year to year, this work is simple; but where the vines have become covered with long straggling spurs, and are generally very unsightly, the best plan is to cut them hard back, so as to cause them to throw out good strong shoots near the main stem. These shoots can be laid down in the place of the old wood in following seasons, and the whole bearing portion of the vine will be thus renewed.

Where vineyards have been pruned, the prunings should be gathered and burnt, and the land should receive a good ploughing.

# QUEENSLAND AGRICULTURAL JOURNAL



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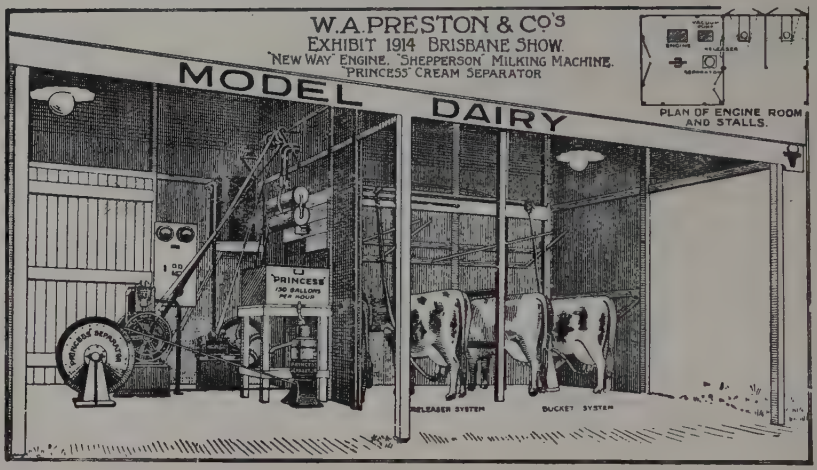


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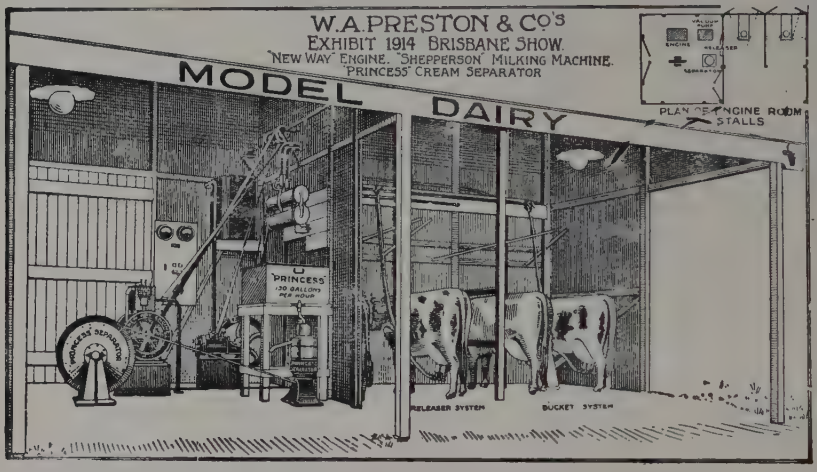


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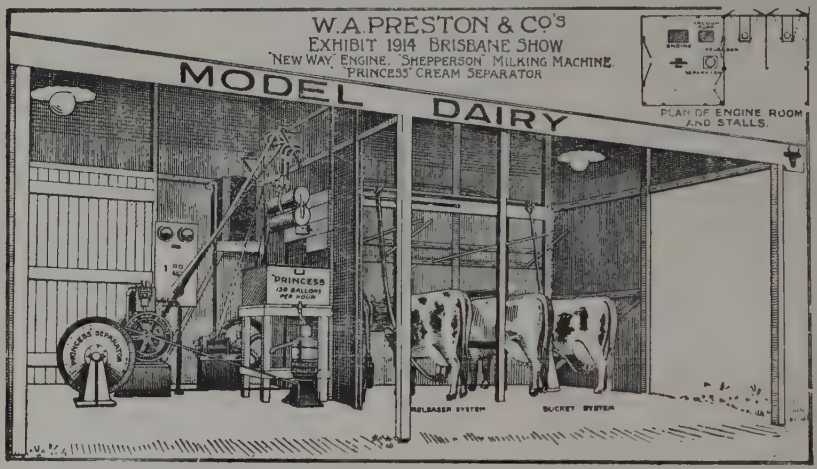


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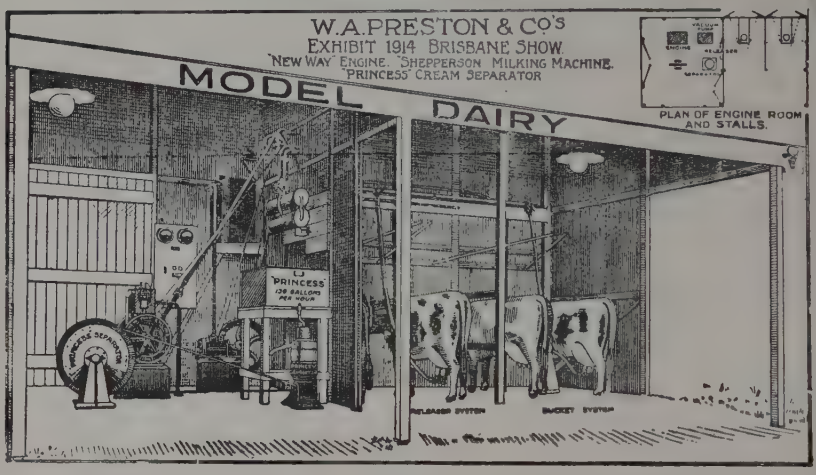


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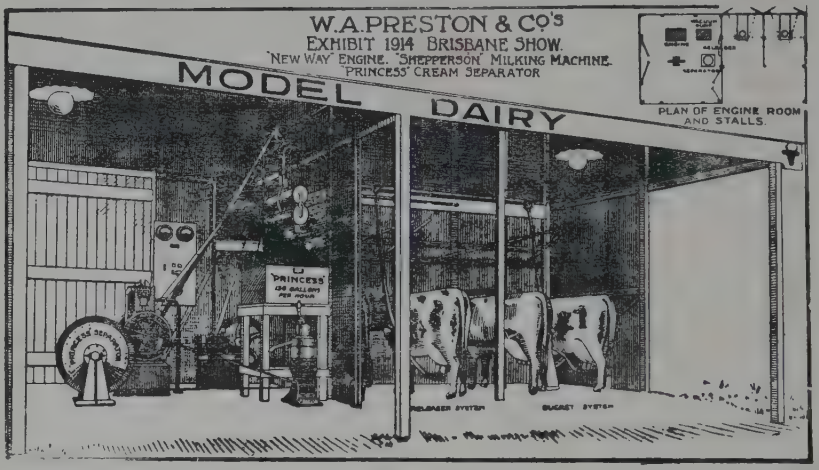


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QUEENSLAND AGRICULTURAL JOURNAL

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# Agriculture.

## THE INFLUENCE OF AGRICULTURAL CONFERENCES ON FARM LIFE.

BY THE EDITOR.

One of the great advantages which the farmer has over all other workers is the healthfulness of his occupation. His work may be, and undoubtedly is, hard; but if he would pause to think of his surroundings, of his conditions of life, and of the wide and promising field which it opens to him for scientific research—if he would recognise that his is a vast and elevated arena in which he may exercise his mental as well as his bodily powers—if he would see that his art or profession is one in which distinction and honour are to be attained, even more worthily than by the more mentally laborious, learned, and other professions—then would he realise that his life and profession are things in which he may justly rejoice.

He stands before the world as a public benefactor, in the generality of cases, however, without being conscious of the fact. Farming is the only business in the world in which the man who can beat his neighbours in his results, produce better crops, and surround himself with greater comforts, becomes a public benefactor. This is clearly enough to be proved. The tradesman who gets up in the world, does so at the expense of his customers and of his brother traders. He makes money, if successful, by what are called smart business strokes, but successful dealing does not constitute him a public benefactor, rather the reverse, and his methods are of no importance or value to anyone but himself. No one is the richer for his exertions but himself, but many are poorer.

The farmer, on the other hand, cannot, even if he wished to do so, hide the secrets of his success. All his work is open to the world to criticise and emulate or to improve on. Has he succeeded in producing the two proverbial blades of grass, he does not keep his methods to himself, but he calls his friends and neighbours together to rejoice with him over his success, and to show them how they may go and do likewise. The way in which he sets about the tilling of his land, the treatment of his stock, the seasons at which he sows, plants, and reaps, the manner in which he stores and markets his produce, are all open secrets, which he gladly imparts to his neighbours. Not content with his immediate friends, he does what he can to spread his superior knowledge throughout the country, and in no better manner does he do this than by attending agricultural meetings and conferences, where he either speaks or reads papers on subjects with which he is better acquainted than others.

We are led to these remarks by considering the work done at the several Conferences held in the past, where some 150 of the most intelligent and highly trained planters, farmers, orchardists, and dairymen have given Australia the benefit of their ripe experience and of the experience of those who sent them to the Conference to represent them. These hundred and odd delegates were exponents of the views of probably a hundred thousand people engaged in rural occupations. Their papers and speeches, and the animated discussions thereon, will be read by many hundreds of thousands of agriculturists, fruit-growers, planters, and others, not only throughout Australasia, but almost over the civilised world; for the *Queensland Agricultural Journal,* in which the proceedings of the Conferences were published, finds its way from Queensland to the outside four-fifths of the world. We merely mention this to show that the farmers, so far from hiding their light under a bushel, as tradespeople do with the secrets of trade, blazon forth their successes equally with their failures, and thus, as we have said, become public benefactors. Their success in life has this to still further sweeten it: It has not been the result of grinding the life out of others, it has caused no single heartache to unfortunate debtors, but has been hardly earned and honestly gained, and everyone round these captains in the ranks of practical farmers is, or ought to be, the richer for the example they furnish, while no one is made poorer by their success.

The Annual Conferences, which were held alternately at the various centres of the agricultural industry, exercised a most beneficent influence upon the various branches of agricultural science. During the course of the year, new discoveries, new inventions, new plants, and new methods come thick and fast; and what time so well chosen to propagate all new ideas as the week of the Agricultural Conference, where men are gathered together from the four corners of Queensland, intent upon giving and receiving those new ideas?

Our forefathers, even in this fertile land, have reaped the fruits of the virgin soil with scanty appliances and little experience in farming. The rich soil bountifully responded to the most barbarous methods of cultivation. But they have left us, as an inheritance, the duty of restoring the land to its original fertility. How are we to do it? It must

be accomplished by thorough cultivation, subsoiling, drainage, irrigation, and the liberal use of farmyard manure and artificial fertilisers. The modern farmer must, and usually does, discard all antiquated machinery and implements—he casts to the winds many time-honoured fallacious theories. He makes horse, wind, water, and steam do the work our forbears did with their hands. This gives him time to improve his mind by studying modern agricultural literature. It is no longer necessary for him to work sixteen hours a day to "get there." If we reflect on the extent to which we old farmers in the sixties taxed our young muscles at the expense of our brains, the wonder is that we are as intelligent as we are. But for this we have to thank agricultural shows and conferences. There we have tardily learned the lessons by which our sons are now profiting. It cannot be gainsaid that the dull, plodding, hard-labour farmer, who has no time to read, who begins his laborious day tired, and ends it worn out with fatigue, cannot nowadays become a successful farmer. He must blend exercise of the muscles with exercise of the mind. There are no problems in the exact sciences, no questions of law, no intricacies of engineering, so difficult as the problems presented by nature to the farmer. He has to grapple with exhausted soils, insect pests, the vicissitudes of the seasons, with storms, floods, and droughts, with diseases of various animals, with low prices, and short crops. In fact, the whole powers of Nature are alternately arrayed against him, and he must overcome these or go under. Here, then, he has scope for exercising all the faculties of his mind and body, and he has to call to his aid the botanist, the entomologist, the geologist, the chemist, and a host of others expert in some one particular branch of science on which the operations of the farmer depend. By their aid and the exercise of his mental powers, he is enabled successfully to combat and check injurious agencies, to retain and increase the fertility of his land, and to employ such machinery in his work as will leave him ample leisure to read and study the principles of what may be called the noblest and most useful of all professions—agriculture.

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## SCIENCE *VERSUS* ROUTINE.

"The genius of scientific progress, after creating miracles in the industrial domain, has at last seriously undertaken to demolish agricultural routine, that fortress behind which agriculturists have entrenched themselves, and where the deaf and blind will not hear nor see what is to their advantage, thus slowly, very slowly, has agriculture progressed in this age of gigantic strides and discoveries." So wrote Eugene Lange some years ago in the "Official Journal of the Central Board of Agriculture of Trinidad."

The last revelation will cause a revolution in agriculture. The worn-out soil of old Europe will become as productive, if not more so, than that of the Far West of America. The earth will lose its prestige—for there will be no difference between good and bad soil—since soil is not necessary to grow potatoes.

The eminent agronomist, Alfred Dudony, has succeeded in growing potatoes, most esculent, in wire baskets without a particle of earth. It is thus proved that eclosion, life, and prosperity of plants in general, and potatoes in particular, will not require them to bury their roots in the earth, since, with chemicals and scientific culture, they will be independent of soil.

Mr. George Ville having sown four grains of wheat on burnt sand, and watered them with some chemical solution, obtained, for every grain of seed, 20 grains of wheat with straw. The result of these experiments goes to show that the soil itself has no creative power or virtue. Its functions are to support vegetation, to store and distil, under the influence of light, heat, and electricity, the alimentary substances indispensable to the auto-creation, self-conservation, and automatic development of the organs and tissues of plants. The alimentary substances are known, have been counted and analysed. There are fourteen, not one more, not one less, asserts Mr. Emile Gautier. Organic substances: Carbon, hydrogen, oxygen, and azote. Mineral substances: Phosphorus, sulphur, chlorine, silicium, iron, manganese, calcium, magnesium, sodium, and potassium. These fourteen substances nourish all plants without distinction—the tiny grass as well as the giants of the forest—alimentary, venomous, tinctorial, gummy, oleaginous, resinous, textiles, flowers, fruits, &c. The differences are the result of variety of combinations of the primary substances that may be compared to the combination of the twenty-six letters of the alphabet, forming a variety of words.

Of these fourteen substances essential to the life of plants, 93 per cent. are supplied by the atmosphere. In presence of such facts, evidently mere routine will not give an equal result conducive to increased crops from a given acreage.

It is absolutely necessary that the agriculturist should know what relation there is between the plant he cultivates and the soil on which it is cultivated. Advanced scientific agriculture is possible only with the aid of scientists. But it is quite easy for the intelligent agriculturist to step aside from routine and cultivate properly and judiciously. The following approximative analysis, which can be made without apparatus or more than one chemical, will answer in most cases, and ensure better results than are now obtained by many agriculturists.

## TO MAKE AN APPROXIMATE ANALYSIS OF SOIL.

1. Take a given quantity, free from stones or other foreign substances.

2. Dry it perfectly.

3. Take 1 lb. of the soil so prepared, burn it to a red heat; weigh. The difference from the original weight will register the amount of humus.

4. Cool down; then pour on it three times its volume of rain water. Stir with care and subside. Next evaporate the water. Its residue will show the soluble salts.

5. What is now left to experiment upon is pure mineral earth. Pour on it some water, stir well and treat with nitric or muriatic acid

until no effervescence is notable. Then drain, dry, and weigh. The difference from the last obtained weight will register the calcareous part.

6. Dry what earth is left, wash it freely, allowing the water to escape slowly. Continue doing so as long as the water is coloured. Then dry and weigh, and you will have the arenaceous (sandy) portion. The result of these operations will give the proportional composition of the soil experimented on.

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## COMPLETE FERTILISERS FOR FARM, ORCHARD, AND VEGETABLE GARDEN.

From Mr. J. C. Brünnich's work on the application of artificial fertilisers in order to increase the productiveness of the soil, we select the following formulæ for mixed fertilisers suitable for various crops:—

### FARM AND GARDEN.

#### ASPARAGUS.

This plant requires a friable, well-trenched loam, rich in humus.

Heavy dressings of well-rotted stable manure, half-decayed leaves and straw, bones, &c., should be well incorporated with the soil.

The value of the stable manure is greatly increased by the addition of—

2½ cwt. bonemeal
2½ cwt. superphosphate
1 cwt. sulphate of potash
2 cwt. nitrolim
} per acre.

or the same quantities in pounds—viz.—

2½ lb. each of bonemeal and superphosphate
1 lb. sulphate of potash; and
2 cwt. nitrolim

for every 43 square yards of ground.

A good sprinkling with common salt when preparing the bed gives often good results.

When the shoots begin to appear, a dressing with 1 cwt. of nitrate of lime per acre, or 1 lb. per 43 square yards, can be applied to great advantage.

Asparagus is one of the few plants which likes chlorine (a constituent of common salt and of muriatic acid); and, therefore, in the above formula 1 cwt. of muriate of potash may be used instead of the sulphate.

#### BEANS.

Beans grow well on almost any soil, but prefer a well-drained clayey loam. Like all leguminous crops, beans require lime, and the soil should contain a fair amount of this plant food. Apply per acre, according to the quality of soil—

2 to 3 cwt. of superphosphate;
¾ to 1½ cwt. of sulphate of potash;
None to ½ cwt. of nitrolim (or dried blood).

When the beans are grown to be eaten green, the amount of nitrogenous manure can be considerably increased by using 1 cwt. of nitrate of lime, applied in three or four portions as topdressing.

For use in garden, apply—

6 lb. superphosphate,
2 lb. sulphate of potash,
½ lb. nitrolim,

and three topdressings of ½ lb. of nitrate of lime to every 43 square yards.

## BEETS AND BEETROOTS.

Beets prefer a fairly rich sandy loam, but will do well on almost any soil, as long as it is not stiff and clayey. Well-rotted farmyard manure should be applied some time before sowing, and the following artificial fertiliser mixture used when thinning out or transplanting:—

2 to 3 cwt. superphosphate
¾ to 1 cwt. sulphate of potash
1½ to 2 cwt. nitrolim or sulphate of ammonia } per acre,

followed by a topdressing with 1 to 2 cwt. nitrate of lime about a month later. The sulphate of potash may be with advantage replaced by muriate of potash, or, when the sulphate is used, a dressing of common salt will be found beneficial.

Should the beet be grown without a previous application of farmyard manure, the quantity of artificial fertiliser must be increased, using—

4 to 6 cwt. superphosphate
1½ to 3 cwt. sulphate of potash
2 to 3 cwt. of nitrolim } per acre,

when planting, followed by a topdressing of 1 to 2 cwt. nitrate of lime.

In a garden use—

6 lb. of superphosphate,
2 lb. of sulphate of potash,
3 lb. of nitrolim or sulphate of ammonia

for every 43 square yards of ground, followed by a topdressing with 1 to 2 lb. of nitrate of lime.

## CABBAGES.

Cabbages may be grown in almost any part of Queensland under certain conditions, but naturally do best in the colder district. Rich, mellow soil, containing plenty of humus, and an abundant supply of water are required. From 10 to 15 tons of well-rotted farmyard manure per acre, or from 2 to 3 cwt. to every 43 square yards, should be applied when the ground is being prepared. At the time of planting apply—

½ to 1½ cwt. of sulphate of potash
4 to 6 cwt. of superphosphate
2 to 3 cwt. of nitrolim or sulphate of ammonia } per acre,

and about a month later a topdressing of 3 cwt. of nitrate of lime. A second topdressing with 1 cwt. of nitrate of lime, when cabbages begin to heart, is very beneficial.

The same amounts of fertilisers in pounds should be applied in a garden to every 43 square yards, or, as large cabbages should be planted about 3 feet between rows, to every row 43 yards long.

Should no or only a small amount of farmyard manure be available, the amount of nitrogenous manure should be increased by at least one-half.

Commercial mixed fertilisers, containing, besides water-soluble phosphoric acid, 3 to 4 per cent. of nitrogen, and about 2 per cent. of potash, may be used in quantities from 3 to 4 cwt. per acre at the time of planting, a second dressing of 2 to 3 cwt. about a month later, and a third dressing of 1 to 2 cwt. when hearts begin to form.

(To be continued.)

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## PROSPECTIVE POTASH RELIEF.

The "London Public Ledger" recently published the following notes on the question of potash supplies from the "New York Oil, Paint, and Drug Reporter." As the matter is one of great importance to our readers on all sides, we have pleasure in reprinting same, in the hope that it may enable them to obtain any supplies of complete manures that they may need for the coming season more easily than seemed likely without the modifications mentioned by our New York contemporary. If the United Kingdom has permitted the export of cacao to help her colonies and allies, no doubt a way will be found to do the same with potash. According to the "New York Reporter"—

"The week's developments in the potash situation, reflecting the influence of the German embargo upon exports from the country, have been in some respects of a more reassuring character, and, while further advances have been made in some of the salts in the local market, a more reasonable spirit seems to have dominated late trading. In several important instances of embargoes by the foreign Governments affecting the "Reporter's" interests, substantial modifications and concessions have been made, and members of the local trade most directly concerned in the potash restriction have not hesitated to express their confidence that some means will be found within reasonable time, operating to relieve the harsh and unqualifying force of the German decree. Within the last few days has been received from our Berlin consul a cablegram signifying that the German Government has been brought fully to the realisation of the serious loss in revenue and incidentally the hardship that would inevitably follow the absolute restriction upon potash exports. This message voiced the willingness of the German authorities to modify the embargo in its most vital effect—namely, to permit the shipment of potash from the country only after it had been subject to such a denaturing process as would limit the product's consumption strictly to the field of fertilisers. This limitation bears out the force of the argument generally advanced here to justify Germany's action, that it was prompted chiefly to check its possible use in the manufacture of munitions of war by belligerent countries.

"The proposal to denature potash so that it would be incapable of entering any service outside the fertiliser field has attracted widespread interest and comment throughout the local trade, where the subject has been recognised as one of novel and more or less perplexing possibilities. There has apparently never been an occasion before to resort to any means to divert potash from its natural properties, and by what chemical agents this change in its character can be effected, what transformation may be involved in the methods of manufacture in which potash enters as a basic material, or by what processes the fundamental properties can be recovered, are among the problems to confront our importing and consuming interests if this denaturation scheme is carried out. It has been suggested that a sulphating basis might be tried to restrict potash to its most peaceful service, as this method would be simplest and easiest to fulfil the purpose intended. German chemical science has worked out many more intricate questions, and if there may be any sincerity in the desire of the German authorities to satisfy the agricultural needs of the neutral countries, we may feel a reasonable degree of confidence in our share of potash shipments for service in the coming season. Manufacturers of chemical compounds in which potash cannot be replaced may find the question of prospective supplies less hopeful of solution. When the new conditions which they may have to meet are known it will be a keen test of wits in which our ingenuity and adaptability must play their best rôles. The question has been raised in local quarters as to whether there had been any real foundation for the presumption that our imports of potash were being employed in any service detrimental to German interests, since our needs of the material for the usual peaceful arts and manufactures have been so urgent during the last few months as to make any ulterior use an economic perversion.

"The subject of a more capable development of our potash resources has naturally commanded more serious study since the announcement of the German export embargo. The latest advices leave us in apparently the same state of hopelessness as ever. Prospects for bringing the production at Lake Searles, in Southern California, to a commercial realisation now seem to have had little more than a fantastic foundation."
—"Tropical Life."

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## SEED SUPPLY FOR 1916.

By F. F. COLEMAN, Department of Agriculture and Stock.

Owing to the certain scarcity caused by the war, it is of the utmost importance that seed merchants in Queensland make early arrangements for their next season's supply of vegetable and flower seeds; and those who are in the position to import their own supplies would do well to at once get into correspondence with English firms of repute.

It will be a satisfaction to loyal Queenslanders to know that vegetable, flower, and farm root seeds are grown in the South of England on a large scale, many varieties of both vegetable and flower seeds being exported to the Continent and to the United States of America, some of which reach Australia after two profits have been made on them.

Even aster, ten-week stock, and many other choice flower seeds can be grown to advantage in Essex, where most leading houses have seed farms. Turnip, cabbage, beet, mangel, swede, rape, &c., are grown to advantage in both Kent and Essex, and from there exported all over the world. Cheaper seeds may in some instances be obtained, but better it is impossible to procure; the thing is to get these supplies to Australia, at first cost.

Such seeds as cauliflower are grown in Italy, near Naples, and merchants who require large quantities could purchase direct; but for orders of, say, 28 lb. of a variety, London still offers the best market, as the buyer has the assurance that the large firm from whom he purchases has inspected the growing crop, and is satisfied that it is true to name, and free from sports.

Pictorial flower and vegetable seed packets are printed on a large scale in England. Horticultural sundries, such as flower sticks, wooden labels, &c., can also be purchased in London, of better quality, and at lower prices than is often charged by Continental houses.

Any of the firms mentioned below are open to quote for leading varieties at prices that will bear favourable comparison to those that the trade have been in the habit of paying, but it is as well to note that seed catalogues are printed for sending out to all purchasers, and *genuine seed merchants* who send a detail list of quantities and sorts required can obtain *much better terms*:—

Messrs. Cooper, Taber, and Co., Seed Growers and Merchants, 90 Southwark street, London, S.E.—Large growers of cabbage, beet, mangel, turnip, and general vegetable and flower seeds.

Messrs. Hurst and Son, Seed Merchants, 152 Houndsditch, London, E.—General vegetable and flower seeds, farm root seeds, grasses, &c., and sundries.

Messrs. Watkins and Simpson, Seed Merchants, 12 Tavistock street, Covent Garden, London, W.C.—English flower and vegetable seeds.

Messrs. Carter and Co., Seed Growers and Merchants, Raynes Park, London, S.W.—Vegetable and flower seeds. This firm is wholesale as well as retail.

Mr. William Deal, Seed Grower, Kelvedon, Essex—Large grower of vegetable, farm root, and flower seeds. (Large quantities only.)

Messrs. W. W. Johnson and Son, Ltd., Seed Merchants, Boston, Lincolnshire—Vegetable and farm root seeds.

Messrs. Chas. Sharpe and Co., Sleaford, Lincolnshire—Vegetable and farm root seeds.

Messrs. E. W. King and Co., Seed Growers, Coggeshall, Essex—Vegetable and flower seeds, mangels, swedes, &c.

Messrs. John K. King and Co., Seed Growers, Coggleshall, Essex—Vegetable and flower seeds, mangels, swedes, &c.

Messrs. Toogood and Sons, Seed Merchants, Southhampton—Vegetable and flower seeds, mangels, swedes, &c.

Messrs. Blake and Mackenzie, Ltd., Printers, Islington, Liverpool —Seed packets, pictorials, &c., and seedsmen's requisites.

Messrs. Corry and Co., Ltd., Horticultural Sundries Merchants, Bedford Chambers, Covent Garden, London, W.C.—Wood labels, flower sticks, and general sundries.

Mr. G. H. Richards, Sundries Merchant, 234 Borough High street, London, S.E.—Sundries, sticks, labels, &c., &c.

Above are all English firms of high standing; there are, of course, several others in the wholesale trade.

Messrs. Watson and Scully will be found good shipping agents, and might give buyers the chance of sending several orders in one lot. Their address is—90 Lower Thames street, London, E.C.

In writing to any of the above for prices, quantities, varieties, &c., should always be stated, as well as terms suggested by buyers; it would also be as well to enclose copy of the "Pure Seed Regulations" to enable the sellers to quote for such seeds as will, *on arrival, comply* with the Act.

The Department will at any time give any further information that may be required.

The following are good seed firms in France, Holland, and Italy:—

*French*—Messrs. Vilmorin, Andrieux and Co., 4 Quai de la Megisserie, Paris—Vegetable seeds and flower seeds.

Messrs. Dupanloup and Co., 14 Quai de la Megisserie, Paris—Vegetable seeds and flower seeds.

*Italian*—Messrs. Damann and Co., San Giovanni à Teduccio, Naples, Italy—Cauliflower and some flower seeds.

*Dutch*—Messrs. Sluis and Groot, Enkhuizen, Holland—Large importers of Italian cauliflower seed.

## MANURE FOR WHEAT.

The Agricultural Chemist, Mr. J. C. Brünnich, recommends an application of a half to one cwt. of superphosphate per acre, and states that the application of lime would improve the texture of a light, loamy, slightly sandy soil, inclined to be somewhat cementy when dry, and prevent cementing. Limestone screenings or crushed limestone, at the rate of 1 ton per acre, should be used.

## CHICORY NOTES.

Quantity of seed required per acre: For roots, from 1 to $1\frac{1}{2}$ lb.; for a green forage crop, from 10 to 12 lb.

| | |
|---|---|
| Weight of seed per bushel .. .. | 27 to 30 lb. |
| Seeds in 1 lb. .. .. .. | 335,000 |
| Weight of raw roots per bushel .. | 40 lb. |
| Weight of kiln-dried sliced roots .. | 30 lb. |
| Average produce of roots per acre | 5 to 10 tons |
| Loss in weight by roasting .. | 20 to 30 per cent. |

Roots may be sliced in a turnip cutter.

# Pastoral.

## THE STOMACH-WORM IN SHEEP (*STRONGYLUS CONTORTUS*).

By W. G. BROWN, Sheep and Wool Expert, Department of Agriculture and Stock.

Taken as a whole, Queensland is singularly free from serious diseases in sheep as compared with other countries, and even with the other States of the Commonwealth. Those we have are, with one exception, parasitic diseases, the chief of which is stomach-worms. It is the object of this article to put some evidence before the sheep-farmers of the coastal areas which will show them that the only really serious drawback to their keeping sheep successfully is the presence of stomach-worms on much of the country east of the Dividing Range. If we can check or abolish this pest, then there is no country in Australasia where mutton, lamb, and wool can be grown more profitably. The worm is a pest elsewhere on areas such as the Darling Downs, Peak Downs, the Central District, as far west as Jericho, the Maranoa and Roma districts, and in the South of Queensland, as far west as the Warrego River, and the flock-owners are able to deal with it there. I have not the least doubt that it may be dealt with on the coast, for I have been doing so successfully since the end of last year.

All the professional evidence I have been able to find, bearing on this subject, agrees that the life-history of *Strongylus contortus* is known. That being so, we are a long way on the road to success in dealing with the pest. A short *résumé* of this evidence, and some conclusions which are obvious in the light of that knowledge, will help us to deal successfully with the problem in Queensland.

### LIFE-HISTORY OF THE STOMACH-WORM.

According to the helminthologists* the female stomach-worms lay their eggs in the bowels. These eggs then pass out of the body in the droppings. They contain living embryos which undergo further development upon reaching moisture in sufficient quantities. The embryos moult three or four times after hatching, this process lasting from three days to four weeks, according as the warmth and humidity are greater or less. The worms then climb the stalks of grass, and await the coming of a suitable host—that is, a cud-chewing animal. The worms are swallowed with the grass, and these, in the process of digestion, make their way to the fourth stomach, there again to lay eggs which pass out in the droppings; and so on, until the host dies, or the worms are expelled. It is known that the young worm is easily killed by cold or dryness, but when it is in the ensheathed or final form it may live for months. It is the ensheathed form which, endowed with length of life, matures in the stomach, and produces eggs, after being taken up by the sheep.

* Helminthologist: One who is versed in the natural history of worms.—Ed.

## METHODS OF DESTRUCTION OF WORMS.

All the authorities agree—and it is plain common sense to agree with them—that, as Dr. Theiler, of South Africa, points out, " so long as sheep graze over a pasture infected with stomach-worms, so long will they become reinfected, particularly when the climatic conditions—warmth and moisture—are favourable for their exit from the eggs and development to the unsheathed stage."

There are three ways of clearing the pastures from worms—

1. Burning off grass at a suitable time.
2. Allowing the pastures to lie idle, as far as cattle, sheep, or goats are concerned, for twelve months.
3. Sowing salt at the rate of 5 cwt. per acre on the paddocks infested with worms. Salt is known to be deadly to parasites of all kinds.

All these methods have been tried in one part of the world or other, but only the first and second are practicable in our case.

With the plan of burning off, it is necessary that the holding be cut up into comparatively small areas, for it is seldom that a man can afford to burn off the whole of his grass at one time. It is necessary also, when a paddock has been burnt off, that sheep put into it should be thoroughly drenched. Ten acres is not too small an area where Rhodes and Paspalum are well established. Small paddocks are essential for other reasons, if success in fattening sheep be desired. Too many sheep-farmers in this State have their sheep in paddocks so big that the great bulk of the grass is destroyed by the sharp toes of the flocks, instead of being eaten.

As regards the plan of letting the paddocks lie idle, Dr. Theiler states—" The ensheathed form of the worm has been found alive six months and more after being deposited"; and further, he states, " that a field which has had no sheep, cattle, or goats in it for a year, will practically free itself of worms."

Here again the advisability of small paddocks comes in. A farmer could very well spare, say, 25 to 50 acres in a year out of, say, 500 acres without seriously missing the grass. The paddocks, besides, could be still used to graze horses, without infecting them with stomach-worms. The net result of the above, then, is that it is useless, or comparatively so, to clean a pasture of worms if sheep containing worms be allowed to graze on these clean pastures. It is necessary therefore that, if possible, the worms be killed or expelled from sheep which are to be placed on clean areas of any kind. This conclusion leads up to the various remedies which are being used to expel or kill the stomach-worm in sheep.

## TREATMENT OF SHEEP INFECTED WITH WORMS.

An illuminating article appeared in the " American Veterinary Review" for February, 1915, by Mr. I. F. Craig, M.A., M.R.C.V.S., on the " Use of Drugs in the Treatment of Disease caused by Nematode

Worms.'' He treats on the parasites affecting horses, cattle, sheep, &c. I have extracted from that article a number of Mr. Craig's conclusions *in re* sheep. He states—

'' The general symptoms associated with the presence of worms are unthriftiness, debility, and anæmia.'' [To these may be added, as I find it in my experience, severe scouring in the early stages of the attack of worms in sheep.] ''It is possible, too, that mechanical irritation may cause reflex nervous symptoms such as convulsions or epileptiform fits. These troubles may be caused by the actions of toxins formed by helminths (worms). The first object in all treatment of disease is in removing the cause; in this case, nematode (or round) worms. The removal of the worms is brought about by anthelmentics. Those usually employed are: Oil of turpentine, coal tar creosote, carbolic acid, lysol, empyreumatic oils,* naphtholin, thymol santonin, arsenious acid, potassium antimony tartrate, common salt, sulphate of copper, sulphate of iron, areca nut, male shield fern, chenopodium, picrate of potash, kamala, rousso, quassia, oil of cade, carbon disulphide, assa-fœtida, eucalyptol, benzine, and pomegranate and pumpkin seeds.''

Mr. Craig dismisses many of these, mainly on the score of expense and general unreliability. He says—

'' When dealing with worms in the stomach or intestines, it is necessary to have these organs as empty as possible, by withholding water and food for from twelve to twenty-four hours, to allow the drug, without undue dilution to come into direct contact with the parasites.''

Mr. Craig states further: '' The second part of the treatment consists in counteracting the effect of the worms by a generous diet and a course of tonics. Some of the anthelmintics—such as arsenic and sulphate of iron—will act in this way.''

The use of arsenic has often been stigmatised by the proprietors of drenches which are professedly non-arsenical. All the evidence which comes to hand shows that the basis of all drenches must be arsenical. Here is Mr. Craig's opinion—

'' One reason that the action of vermicides is not very certain, even in the *Strongylidiæ* in the Caecum and the Colon, is that the agents given are partly absorbed before they reach these organs, and are very much diluted in the contents of such organs, which always contain a huge mass of ingesta, even after withholding fluids or food for many hours or days. Hence, arsenic in its solid form is more likely to exert a vermicidal effect upon the worms than some of the more soluble agents.''

This effect is in agreement with my experience. I have tried a number of specifics in the endeavour to find a really good vermicide, and have, as yet, not found one so good as the old arsenic and Epsom salts

* Empyreumatic: Having the taste or smell of burnt animal or vegetable substances.—Ed.

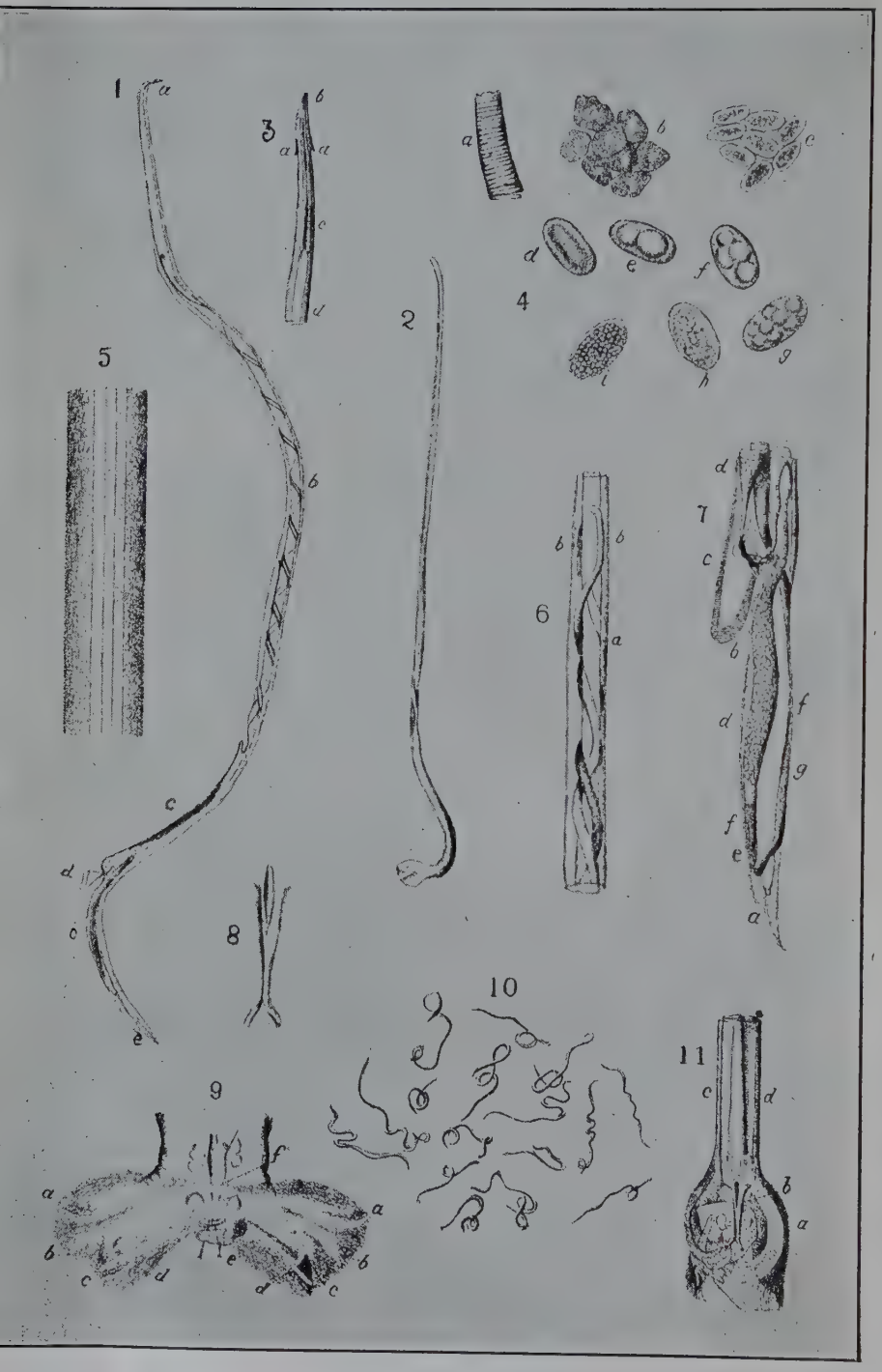


PLATE 1.—STRONGYLUS CONTORTUS. (The Twisted Stomach-worm.)

drench of our grandfathers. Since 1st January, 1915, I have drenched upwards of 25,000 sheep in all stages of infection and in many widely separated districts, and in small lots of not more than 2,000 sheep, and have found that, at the least, the sheep have been prevented from dying through worms.

Some more of Mr. Craig's notes are worthy of reproduction. He says—

"To be of service, anthelmintics (drenches) must be used before acute symptoms set in, or the disease far advanced."

This is really good advice. It is useless to wait until the sheep begin to die before being treated. The signs always appear long before the stage is reached when a good drench is as likely to kill as cure.

"Worms do not multiply indefinitely in the host. The multiplication is outside principally. It is in the young animals grazing on infected pastures that the *Strongylus* cause so much loss. Lambs from three months to nine months old are especially liable."

This is borne out in Australia. In my experience, most of the big losses due to worms have occurred in lambs. It is wise, therefore, to drench lambs, especially weaners, whether they show signs of worms or not—that is, of course, on infected country.

In next month's Journal will appear some of the results of Dr. Theiler's very exhaustive experiments in South Africa, with a short *résumé* of his conclusions. The whole article appeared in the "South African Agricultural Journal" for October, 1912.

[TO BE CONTINUED.]

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## DESCRIPTION OF PLATE.

STRONGYLUS CONTORTUS.

FIG. 1.—Adult female magnified six times: *a*, head; *b*, ovaries wound around intestines; *d*, papillæ.

FIG. 2.—Adult male magnified six times.

FIG. 3.—Head: *a*, two-barbed papillæ.

FIG. 4.—Eggs highly magnified: *a, b, c, d, e, f, g, h*, different stages of development; *i*, egg as it is laid.

FIG. 5.—Skin showing nine of eighteen longitudinal lines.

FIG. 6.—Portion of female: *a*, intestines; *b, b*, end of ovary.

FIG. 7.—Caudal end of female: *a*, vulva; *b, c*, vagina; *d, d*, uteri filled with eggs; *e*, oviduct; *f, f*, ovary; *g* intestines.

FIG. 8.—Spicula, enlarged.

FIG. 9.—Bursa expanded to show costæ.

FIG. 10.—Group of males and females; natural size.

FIG. 11.—Caudal end of male: *a*, bursa; *b*, spicula; *c*, seminal reservoir; *d*, intestine.

## SETTLERS' FLOCKS ON COASTAL LANDS.

By J. P. CHISHOLM.

It is clear to me that every coast settler should have some sheep—if not for money-making, then from a living standpoint for household meat supply. The matter needs small consideration; the gain is apparent. Fifty ewes well kept will produce fifty lambs, and a wool clip annually. All the ewes may not bear lambs, but some bear twins and others breed twice in twelve months. Fifty lambs a year means a meat supply for a settlers' home—a sheep a week. Ewes not bearing lambs will be good meat—40 lb. to 50 lb. of it, at a cost of, say, 10s. for the sheep (less value of skin), equal to about 2d. for the meat. Skin values vary on the growth of wool. I have before me account sales of skins to 8s. 6d. each. Estimating the yearly increase at fifty lambs from fifty ewes is taking a minimum. With moderately good management, even the worst kind of ewes would do better, and with Lincolns, Shropshire, or more particularly Dorsets, so famous for twins and triplets, a larger increase could be reckoned on.

I may here emphasise my opinion, based on the observations of many years—it is, that the merino sheep is not suitable for coast lands of Queensland and will fail. I refer only to the low coastal belt of country. Anywhere up "on top," I think the merino may do fairly, and the drier the country, in moderation, the better they do; although I doubt if any country is too dry for merinos, so long as there is feed of some kind. They do well on the Lower Murray, in South Australia, on a 7-in. rainfall; and as good a small flock as one could wish for was to be seen in the driest interior, at Bedouri, and for all I know may be there yet. However, I would say—leave the merino to the dry lands.

My experience is with Shrops., Lincolns, Romneys, Dorsets, and, latterly, Border Leicesters. We live 200 miles from the sea, in a 22-in. rainfall in level country. For twenty years breeding sheep have gone from here to all parts of the coast of North Queensland—Mackay, the islands off Bowen, Proserpine, Ayr, the Herbert, and Johnstone Rivers, to Cairns, and many lots to Atherton district. In all the districts I have mentioned, sheep thrive, and, moreover, they thrive in many instances under adverse circumstances due to careless keeping, and in some instances to criminal cruelty and (from a good sheep man's view point) neglect. I know small flocks on the coast lands, unshorn through the seedy period, soiled, with dags hanging to them, and long-tailed unmarked lambs a year old running with their dams. All this, coupled with a total disregard of breeding, and, worse and unkindest of all, often driven into wet yards at night, and often crowded, and yet, despite all this terrible treatment, the sheep are all right. Is any better evidence wanted? Under such conditions, can it be wondered at that merino sheep got footrot and other ailments, and failed?

Most of the coast flocks of my acquaintance are jumble bred of all British breeds, Shrop., Lincoln, and Romney. Our flock here is the same—5,000 to 6,000—a jumble of British breeds. This is not coast country, but it is seedy country. I am often asked why I neglect

particular breeds, I reply that I have my own breed, "Plains sheep," and I show wool returns—once in the last seven years, so low as 10½d. per lb. but all other years up and over 1s., and last year reaching 13¾d. for thirty bales out of seventy-four bales, and at that sale (14th May) not only topping North Queensland, but coming within three of the whole State. I only mention these wool prices as showing that any type of sheep yielding good wool and mutton is a good breed. I give it as my opinion that a combination of breeds produces a sheep more suitable to coastal Queensland than any one particular breed. I mean, so far as my observations go.

Referring to the coast flocks, I have given attention at all times to the health of the sheep, and I have not seen them affected by worms or footrot; and, given freedom from disease, it may be taken for granted the constitution is good. Evidencing this, some seven years ago I bought a small flock of 185, of ill-treated sheep in wet country, near the mouth of the Burdekin River, within a few miles of the sea shore. They had been neglected for years, and I brought them home here, and let them go in the paddocks. A risky thing to do, you may say. It proves my confidence in the soundness of coastal bred sheep. Although that is seven years ago there are many of those sheep here now, and some must be twelve years old. They have been good breeders ever since. There is more Lincoln merino in them than any other breed.

Once the keeping of sheep on coast lands—or any lands except open downs—is mentioned, the reply comes with little variation, "Grass seed will kill them." The fact is, that, given proper management, the vilest black spear grass is harmless to sheep. Here in our paddocks we have miles of the worst grass seed country. The remedy is simple. It is to close shear your sheep just when the grass seed begins to shed, and once or twice in the month or six weeks of the venomous seed period after shearing give the flock a swim through a clean dip or a clear waterhole. I would emphasise the need to have the sheep closely shorn, by machine. It pays every small flock owner to have one of these little hand-turned shearing machines at a cost, I think, of about £3, although the labour of turning is heavier than in the picture.

Close shearing is necessary. The black spear grass seed has a tail that propels the point, and if the tail finds no wool to give it resistance, then the seed simply falls out again, but if odd seeds stick, and get a footing, the swim softens the seed, and the point comes out.

I have often wondered at the good health of sheep when fairly pierced all over with grass seed, and I have often swum woolly sheep, and so saved them, through a bad seedy period. If some seed does get hold in the shorn skin, the growth of wool soon lifts it out, and as the season progresses it dries in the tip, and falls off, leaving the wool clean. In the north the seeding period invariably begins in April, and lasts at the most two months.

As to the period of lambing, the natural time annually is August or September, or may be as late as October. This is all good, as the lambs will be shorn with the flock. Woolly lambs through a seedy period means

dead lambs, but when close shorn they come through unharmed if given the swim once or twice whilst the seed is shedding.

Very often the cry of "worms" is raised when coast sheep are spoken of. I reply that I have not found worms that ordinary care will not combat. Salt, and occasionally some sulphate of iron in the same trough, should always be before coast sheep, and they will soon take a lick of molasses; and even if worms did give trouble, small flocks are easily handled, and dosed, if necessary, in an hour.

An essential to the well doing of sheep is dry foot room to camp, a ridge for choice, and the top of the ridge. Room enough to be comfortable, freedom from noises, more especially the bark of dogs, is necessary for sheep if you would have them do well, and above all quiet handling—no yapping or chasing, but all the time gentle walking and quiet movement; and with that you can take sheep anywhere. In this connection I shall tell a story. A drover camped in cattle country in a dry time with old ewes, shepherded for many months, lost a bunch of 120, and they were not missed. They turned up, however, at a cattle station homestead, thirty miles to the east. In time the drover missed them, and made east in his search. He inquired at the cattle station. "Yes," they said, "the sheep were about here for days."

"Well," said the drover, "you might have known they belonged to somebody, and have put them in the yard."

"We tried to," said the cattle man. "We tried twice, and had everybody on the place out, and dogs besides, and the sheep were too wild. We couldn't yard them."

The case was too bad for words, and the drover went on his way. Here, however, is an illustration of what ill management will do. These old ewes were as quiet as household pets, and a child could have yarded them, anywhere, but the yapping and running, and the dogs, made them unworkable.

It is advisable in all flocks to mark lambs young. The nearer to fourteen days old when marked the better sheep.

A point in sheep keeping is the remembrance of the old adage, "A sheep loveth a short bite," and so it is advisable to put them on to pasture fed down by big stock, or on to burnt country, and if their area is not too large they will keep it down to suit themselves, because they know what is good for them, and will avoid long grass if practicable. Very much of the coast land is good pasture, and in wet times grass grows rapidly, and a home-flock of sheep could be kept on a very small area. I mean, say, five sheep to the acre, so long as the grass is growing, but sheep like a change. They get "paddock stale" and love a scamper round. The heavy wet season weather of the north is bad for sheep carrying much wool, and as the rainy period is January, February, and March, when the sheep are carrying their wool, it is one of the misfortunes of the business. If you have a shed, put the sheep under it on very wet days. Of course, open wool sheep, like Lincoln or Leicester, suffer very little inconvenience from rain, whereas denser woolled sheep would take days to dry; in fact, through a normal wet season anywhere

north of Mackay, they would be wet for months. Hence the need for open wool flocks. Yet the sheltering shed is a small matter; a roof 20 ft. by 12 ft. would easily give comfort to the home flock in heavy wet periods. In the wettest districts of England, where there are more wet days than on Johnstone River, sheep are kept everywhere and without shelter; but there the rain falls mostly in drizzle, and the fleece sheds it, whereas our heavy rainfalls would penetrate and make any fleece sodden. Keeping sheep, and in fact doing many other things in our North country, it is better to produce stock to suit the climate, than expect the climate to suit the stock.

And, moreover, few settlers realise their ideals, the pictures always being a little the best, but yet with ordinary care and management one may get very near perfection, near enough to make comfortable livings from a very small flock of the right sheep.

Concluding, I would say that if more information is wanted by any settler contemplating starting a flock, I shall be pleased to help all I can.

The Plains, Prairie, North Queensland,
1st June, 1915.

[The above corroborates, in the main, the advice given by Mr. W. G. Brown, Instructor in Sheep and Wool, to settlers on the coast, as to the suitability of the coast lands for certain classes of sheep.—Ed. "Q.A.J."]

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## WHAT IS A HOGGET?

Two graziers in a railway carriage are conversing on market prospects, and one remarks that he expects to get a good figure for his hoggets. When they had left the train, one of the remaining occupants asked his neighbour, "What's a hogget?" "Well, I don't know exactly," was the reply, "but I think it has something to do with a pony when its mane is cropped." "Not at all," interjects the other, "a hogget is a young pig." A new passenger comes in, and it is resolved to leave it to him. "A hogget?" sagely replies the newcomer, "well, you'll have to excuse me, gentlemen, because I really don't know anything about poultry."

What, then, is a hogget? An old cutting from the "Stock and Station Journal" supplies the answer. This is in the form of a letter to the editor and is as follows:—

"SIR,—Someone having asked in the 'Stock Journal' 'What is a hogget?' you say that the editor of the 'Queensland Grazier' says that 'a young sheep is a hogget until its first fleece has been shorn, and after that operation it's a hogget no longer, but some other kind of sheep.'

"According to his definition, a lamb shorn when, say, four months old could never become a hogget. And if it were never shorn, it would remain a hogget all its life. Perhaps he means that the first fleece is a hogget. But that can hardly be the case, because there would be such a wide difference between a fleece taken from a five-months-old lamb and another taken from a sheep eighteen months old, that the same name could not cover both.

"Now, I am going to give you my definition of a hogget. And to start with, I must confess my ignorance as to the literal meaning of the word 'hogget.' But by custom it means (in Australia) a particular kind of sheep. It does not apply to any particular breed or condition, but to 'age.'

"A sheep when born is called a lamb, when weaned, a weaner. A weaner and a lamb, too, at the same time, whether shorn or not. And it is called a lamb until it begins to lose its first teeth, no matter whether it be weaned or shorn, or both, or neither. When its first two permanent teeth begin to show, it is a hogget. When it gets four teeth, it is no longer a hogget. Hence a hogget is a two-tooth, and a two-tooth is a hogget, shorn or unshorn.

"Still, I 'may' be wrong after over thirty years' experience among sheep."

An English dictionary defines a hogget as a two-year-old sheep. In the woollen manufacturing trade, hog fleece, hog wool is described in "Goodchild's Technological Dictionary" as the first shorn fleece of a young sheep. In his work on "Wool," A. Hawkesworth, woolclasser to the Sydney Technological Museum, in 1891, gives "teg," "hog," or "hogget" wool as the first fleece from a sheep that has not been shorn as a lamb, and "shurled hogget" as the first fleece from a sheep after it has been shorn as a lamb.—Ed. "Q.A.J."

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## THE NUBIAN GOAT.

This animal in colour is black or tan, or a mixture of the two colours, either predominating. The bucks are hornless, and do not have that disagreeable odour which the common buck is distinguished for. In size they are almost as large again as the common goat, and are recognised as the best milkers of any class of goats known, yielding from 4 to 6 quarts a day, and are very docile. They are natives of the State of Nubia, in Egypt, of which State Khartoum is the chief centre. They do not like the cold. Fanciers have tried to acclimatise them in England, but with poor results. In this connection, they should do well in Queensland, as the climate is so mild.

Goats do not contract tuberculosis, thereby the necessity for boiling the milk is eliminated; and when milk is boiled it is also spoiled, for the reason that boiling or scalding changes the composition and also makes it indigestible. It is obvious that goat's milk is highly desirable for children. The milk is very easily digested, even by the most delicate child or invalid. The reason for this is, that the butter-fat is in such minute particles—so small, in fact, that the cream cannot be separated. The butter-fat is all through the milk—*i.e.*, better held in suspension than cow's milk, from which, if left standing, the cream comes to the top.

In England, Europe, and America the milch goat is given the prominence that the animal deserves. Here, in Australia, they are mostly despised, through a lamentable lack of knowledge regarding their value.

The illustrations are taken from Bryan Hook's work on "Milch Goats and their Management."

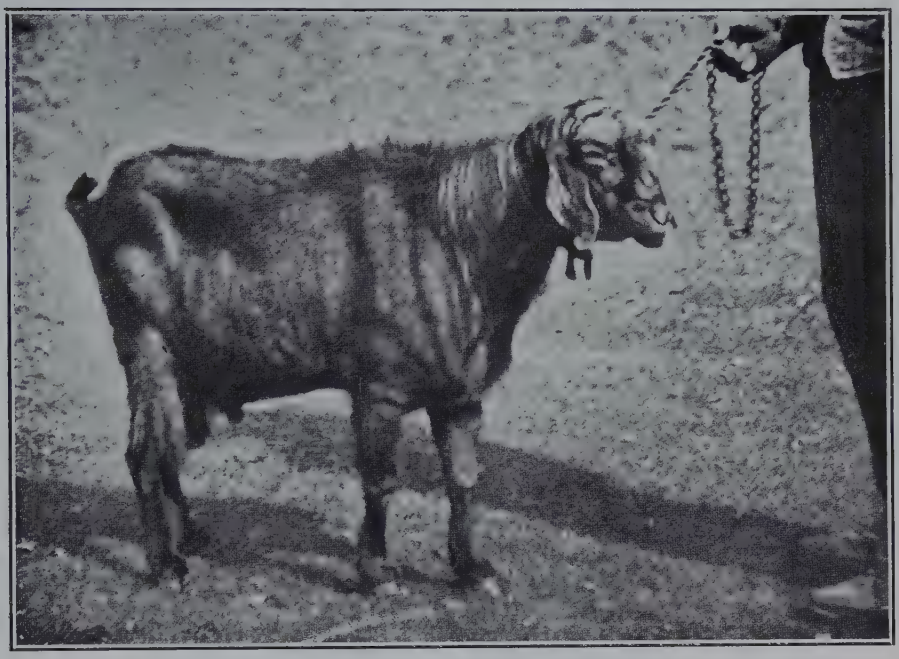

PLATE 2.—IMPORTED NUBIAN STUD GOAT, ALI BABA.

## ABOUT MILCH GOATS.

In answer to many inquiries about the American Milch Goat Association, W. A. Shafor, Hamilton, Ohio, issued the following notice:—

More than twenty years ago an English writer said: "Much has been written and published on the advantage of goats' milk as a diet for young children and persons suffering from wasting diseases, consumption in particular, and many instances have been given in which lives have been saved by its use"; still this valuable article of diet, though better appreciated than it was twenty years ago, is a long way from holding the position it deserves in public estimation generally. A fact has, however been brought to light lately, the result of scientific investigation, which still further enhances the value of goats' milk, and that to an immeasurable degree—a fact that cannot be too widely known, and the importance of which cannot be over-estimated. The numerous inquiries that have been conducted of late years by scientists have elicited what is now pretty generally admitted by medical men—that tuberculosis can be, and is, communicated to human beings through the milk and flesh of cattle afflicted with that disease, the increase of consumption in children being largely attributed (according to Sir Lyon Playfair) to the use of tuberculosis milk. Now, when we consider, on the one hand, the terrible character of this insidious disease, and on the other hand the absolute necessity for the use of milk in the healthful rearing of children, such

a revelation is simply appalling. What makes matters worse, moreover, is that a cow may be suffering from the malady in its earlier stages without the disease being detected. For we are told that "there may be no appearance visible to the naked eye of the action of the tubercular bacillus in a particular animal, and yet it may not improbably be there."

"In view of such a state of things, who will not experience a sense of relief on hearing that goats' milk is entirely free from this element of danger? Professor Nocard states that out of over 130,000 goats and kids that are brought to Paris for slaughter at the shambles of La Villete every spring, the meat inspectors of that city have failed to discover a single case of phthisis. What is far more remarkable, however, he tells us that even inoculation fails to introduce the fatal bacillus into the system of the goat."

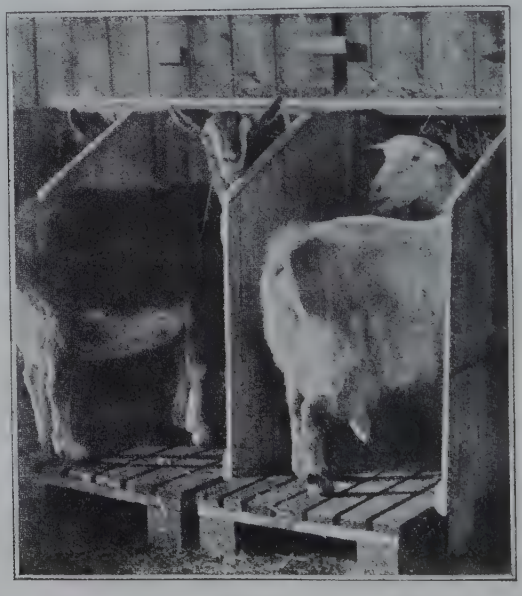

PLATE 3.—THE SAANDEN (SWISS) GOAT.

Another English writer says: "Goats' milk is a grand adjunct to the diet of those who are just beginning to regain strength after long severe illness. A diet consisting largely of goats' milk would restore many a convalescent far more speedily to health without the aid of drugs than anything I know of. A course of goats' milk may often be taken with advantage in the autumn by those who suffer much from cold during the winter months, but who do not care to take cod liver oil."

Many persons who, owing to their circumstances or surroundings, cannot keep a cow could well keep a goat. The first cost is very small, and any little outhouse with a tight roof and ventilated will accommodate it, and much of the waste that is now consigned to the garbage heap could be turned into pure, healthy milk if properly managed, for a goat will thrive where a cow would starve. Yet it must not be forgotten that with more room and greater variety of food better results may be obtained.

## BORDER-LEICESTER SHEEP.

By P. R. GORDON.

The Border-Leicester Sheep has long been the favourite sheep in the South Island of New Zealand for crossing on the Merino and for the production of crossbred lambs for export. There are different opinions as to the early origin of the Border-Leicester breed, but the opinion most generally accepted is their being a direct offshoot from the Dishley Leicesters of Bakewell's time, further improved, or at least modified, in type on the Scottish border. What we are now accustomed to call Border-Leicesters are believed to have been taken north from Leicestershire about the year 1767 by the brothers Culley, who held the large farm of Wark and other belongings in Northumberland. No reliable information exists as to when the name Border-Leicester began to be applied to the breed, but no doubt it would be gradually adopted and used to distinguish them from the Leicestershire sheep. The Culleys were intimate friends and disciples of Bakewell, and after they had acquired the sheep naturally set about following the same lucrative enterprise as did their patron. Their sheep soon became known over large districts, and it is not difficult to imagine how the new name would gradually come into use and how it would be, to some extent, necessary to distinguish between them and the local Cheviot sheep as well as those of the parent stock of Leicestershire. These remarks will be followed much easier if it be at once noted that the type of Leicester raised by the Culley brothers was a modified type of the original Leicester, probably as much modified as to be qualified to establish a type of its own, even if left in its native home. The English Leicester of the present day and the Border-Leicester are, to a large extent, different animals. The former have the old characteristic tuft of wool on the forehead, wholly absent in the Border-Leicester. The English Leicester is also, as a rule, lower in the leg than his northern brother, and carries his mutton rather lower. There are also differences in style and coat. At the same time, there are sufficient resemblances between the two breeds to warrant the belief that they came originally from the same stock.

There has always prevailed a good deal of conjecture as to the methods of mating and crossing followed by Bakewell in the evolution of the great breed with which his name will ever be associated. There is just as much speculation *re* the methods of the Culleys. Some have maintained that they stuck pretty closely to the modified type of Leicester they took north to the Scottish border. Others have held that they utilised the Cheviot blood in addition. But the important, substantial fact is, that they succeeded in turning out a new race of sheep of great excellence, which, although no doubt altered to some extent in appearance since, still survive as a monument to their memory.

In 1790, it is reported that the Border-Leicester sheep at Mertown, in Roxburghshire, were even then of as high quality as those owned by the Culleys in Northumberland. No doubt they had been acquired, either from the Culleys or from the original source. Lord Polworth followed Bakewell's system of inbreeding to a great extent, and from the beginning of the last century no single sheep born outside the

flock was used in it for fifty years. But whether the Cheviot played a part in the operations before that period is what a great many of the leading authorities find hard to disbelieve; in fact, many of them prefer to do so. It is generally understood that facility and success in crossing bears some analogy to common ancestry, as we see in Clydesdale and Shire crosses, but in subsequent operations even in those crosses themselves. Be the conjecture as it may, the breed has been sufficiently established to ensure its prepotency in the production of a prime all-round improver of other breeds, to an extent equalled by no other variety of sheep. In judging the breed, greater emphasis has always been put on the head, where one can best tell as to the character, constitution, and breeding of the animal. It should be carried above the line of the animal's back, the crown should be level, the eyes set well up, the face well filled and naturally arched to the muzzle. The jaws should be deep, the eyes bold and luminous, and the nostrils wide, the latter denoting strength and vigour. The colour should be white, but not pale, and a fleshy nose and pinky eyesetting are to be avoided, as suggesting delicacy and softness of constitution. The neck should be fairly strong and muscular, and in the ram slightly arched on top. A strong neck vein is also very important, and it should run naturally into the shoulders, which should be obliquely set to the body, as in the Aberdeen-Angus bull. The back of the sheep should be perfectly level and straight from neck to tail. The loins should be wide and firm to the touch, and the ribs round and wide, with the flesh well carried upon them. This formation has a tendency to make the animal look a trifle leggy or high-standing when shorn, but for a breed which is so largely used for crossing and putting mutton on other breeds it is a point of great importance. The wool should be long and soft and in little locks or curls—which is called "pioly." This "piol" is best seen in sheep which have been only a month or two dropped, the wool being in little clusters of ringlets all over the body. The belly of the sheep should be well covered, although plenty of outstanding sheep show a little openness below. Breeders, however, try to hide this defect as far as possible. With the head and ears, the legs of the sheep should be uniformly covered with nice short white hair. Over and above all, the typical Border-Leicester should have free and easy movement. A sheep may be ever so good under the hand, but unless he walks nicely and keeps his head well up, he has not the best indications of constitution and vigour. As it follows that, to walk well, a sheep must be well set on his legs; the legs should be clean, flat, and flinty, and the hocks naturally bent without being hooked. Above all, the backbone should only be felt through a thick pad of flesh.

What the Border-Leicester has done for the frozen meat trade in New Zealand would be hard to estimate. What they could do in a similar capacity in Queensland would be to speak of even better results. Whether in the production of fat lambs or as high-class wethers, suitable alike for the butcher and freezer, it would be impossible to speak too highly of them. Over a great part of Queensland the rainfall is uncertain, and good seasons do not always follow one another. In some of the other mutton breeds, if the lamb is lost to the freezer through a bad season it is little use as a wether. But the Border-Leicester is an exception, as he not only makes a good lamb in a good season, but if that fails he furnishes into a good wether even if he gets a check in his infancy.

There are in Queensland several who have adopted the Border-Leicester, including some who have had New Zealand experience of the breed.

Photos of a typical ram and ewe of this breed are here reproduced.

PLATE 4.—BORDER LEICESTER RAM AND EWE.

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF MAY, 1915.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Noble Dot ... | Jersey ... ... | 2 May, 1915 | 666 | 4·7 | 36·89 | In addition to grazing on natural grasses, the cows received a ration of ensilage throughout the month. |
| Iron Plate ... | ,, ... ... | 21 Feb. ,, | 485 | 5·6 | 32·11 | |
| Netherton Belle | Ayrshire ... ... | 23 April ,, | 532 | 4·6 | 28·82 | |
| Honeycomb | Shorthorn... ... | 27 July, 1914 | 337 | 6·4 | 25·57 | |
| Lady May ... | Ayrshire ... ... | 7 Mar., 1915 | 707 | 3·1 | 25·54 | |
| Thornton's Fairetta | Jersey ... ... | 27 Mar. ,, | 456 | 4·6 | 24·71 | |
| Bella .. | Ayrshire ... ... | 19 Jan. ,, | 512 | 4·0 | 24·04 | |
| Sweet Meadows | Jersey ... ... | 28 July, 1914 | 276 | 7·2 | 23·62 | |
| Nina ... | Shorthorn... ... | 18 Feb., 1915 | 553 | 3·6 | 23·30 | |
| Burton's Lily | ,, ... ... | 17 Nov., 1914 | 427 | 4·6 | 23·14 | |
| Madame Melba | Holstein ... ... | 8 Sept. ,, | 537 | 3·6 | 22·63 | |
| Miss Jean ... | Ayrshire ... ... | 24 Nov. ,, | 382 | 4·9 | 22·07 | |
| Lady Melba | Holstein ... ... | 6 Mar. ,, | 460 | 4·0 | 21·59 | |
| Miss Melba | ,, ... ... | 22 Nov. ,, | 592 | 3·1 | 21·38 | |
| Lady Loch II. | Ayrshire ... ... | 8 Feb., 1915 | 431 | 4·2 | 21·26 | |
| Violette's Peer's Girl | Jersey ... ... | 22 Oct., 1914 | 293 | 6·0 | 20·80 | |
| Lady Annette | Ayrshire ... ... | 26 Dec. ,, | 354 | 4·9 | 20·46 | |

## SISAL HEMP.

From Messrs. Landauer and Co.'s (London) "Weekly Market Report," dated 21st April, 1915, we learn that during that month more imported quantities of Mexican sisal were allowed to be exported from Progreso (the Mexican port for shipment of sisal hemp), and American operators have been thus able to secure free supplies of this commodity. The price paid is understood to be in the neighbourhood of £25 to £26 per ton c.i.f. New York. Even at this figure, however, the article is of little interest to European buyers, for the reason of the fact that it is impossible to secure freight below £6 to £8 per ton. Meanwhile, values remain, for Mauritius hemp (*Furcrea*, which grows like a weed on waste land in many parts of Queensland from South to North), £33 to £34 for prime, and £31 to £32 for good fair.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, MAY, 1915.

Four thousand and forty-nine eggs were laid during the month. Since the last report Mr. Parker's birds have had a slight attack of warts, and have in consequence fallen off in their laying. Several pens have an odd bird or two in moult, whilst there are five of Mr. Forsyth's, four of Mr. Gill's, and three of Mr. E. A. Smith's White Leghorns in trouble in this direction. A. H. Padman wins the monthly prize with 133 eggs. The following are the individual records:—

| Competitors. | Breed. | May. | Total. |
|---|---|---|---|
| Mrs. J. Jobling, N.S.W. | Black Orpingtons | 128 | 251 |
| Jas. McKay | White Leghorns | 109 | 231 |
| C. B. Bertelsmaier, S.A. | Do. | 100 | 217 |
| A. H. Padman, S.A. | Do. | 133 | 214 |
| S. E. Sharpe | Do. | 88 | 208 |
| J. D. Nicholson, N.S.W. | Do. | 106 | 208 |
| J. Gosley | Do. | 110 | 193 |
| Mrs Munro | Do. | 110 | 192 |
| A. W. Bailey | Do. | 120 | 186 |
| J. R. Wilson | Do. | 100 | 185 |
| T. Fanning | Do. | 87 | 184 |
| A. T. Coomber | Do. | 84 | 171 |
| C. Knoblauch | Do. | 95 | 163 |
| J. M. Manson | Do. | 101 | 162 |
| Dunheved Poultry Farm, Vic. | Do. | 79 | 161 |
| O.K. Poultry Yards | Do. | 65 | 160 |
| J. M. Manson | Black Orpingtons | 94 | 160 |
| C. F. Clark | White Leghorns | 80 | 160 |
| Kelvin Poultry Farm | Do. | 114 | 157 |
| R. Jobling, N.S.W. | S. L. Wyandottes | 85 | 156 |
| E. F. Dennis | White Leghorns | 108 | 156 |
| H. Harnill, N.S.W. | Do. | 93 | 154 |
| E. V. Bennett, S.A. | Do. | 106 | 154 |
| F. Clayton, N.S.W. | Do. | 95 | 145 |
| R. Jobling, N.S.W. | Do. | 88 | 145 |
| Cowan Bros., N.S.W. | Do. | 84 | 137 |
| W. Lyell | Do. | 79 | 133 |
| W. Purvis, S.A. | Do. | 77 | 132 |
| W. Parker | Do. | 31 | 131 |
| E. A. Smith | Do. | 50 | 130 |
| Derrylin Poultry Farm | Do. | 78 | 127 |
| J. Zahl | Do. (No. 2) | 74 | 127 |
| Moritz Bros., S.A. | Do. | 63 | 119 |
| E. Le Breton | Do. | 97 | 119 |
| W. Mencely | Black Orpingtons | 72 | 111 |
| T. Fanning | Do. | 54 | 108 |
| J. Aitcheson | White Leghorns | 90 | 108 |
| Cowan Bros., N.S.W. | Black Orpingtons | 84 | 101 |
| Geo. Tomlinson | White Leghorns | 68 | 101 |
| G. H. Turner | Do. | 63 | 93 |
| J. Zahl | Do. (No. 1) | 57 | 91 |
| R. Burns | S. L. Wyandottes | 37 | 91 |
| R. Burns | Black Orpingtons | 49 | 86 |
| E. Pocock | White Leghorns | 52 | 83 |
| J. H. Gill, Vic. | Do. | 37 | 81 |

| Competitors. | Breed. | May. | Total. |
|---|---|---|---|
| Loloma Poultry Farm, N.S.W. ... | Rhode Island Reds ... | 47 | 73 |
| W. Lindus, N.S.W. ... ... ... | White Leghorns .. | 65 | 71 |
| J. G. Richter ... ... . ... | D . ... . .. | 48 | 56 |
| E. A. Smith ... ... ... .. | Black Orpingtons ... | 17 | 40 |
| W. H. Forsyth, N.S.W. ... ... | White Leghorns ... | 23 | 38 |
| S. Chapman ... ... ... ... | Brown Leghorns ... | 24 | 24 |
| F. Clayton, N.S.W. ... ... ... | Rhode Island Reds ... | 1 | 1 |
| J. R. Johnston ... ... ... ... | Plymouth Rocks .. | 0 | 0 |
| Totals ... ... ... ... | ... | 4,049 | 6,985 |

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF MAY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING MAY, 1915 AND 1914, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | | Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|---|---|---|---|---|
| | May. | No. of Years' Records. | May, 1915. | May, 1914. | | May. | No. of Years' Records. | May, 1915. | May, 1914. |
| *North Coast.* | In. | | In. | In. | *South Coast*—continued: | In. | | In. | In. |
| Atherton ... ... | 2·11 | 13 | 0·60 | 2·40 | Nanango ... ... | 1·70 | 27 | 0·74 | 1·39 |
| Cairns ... ... | 4·57 | 27 | 3·27 | 6·17 | Rockhampton ... | 1·70 | 27 | 0·84 | Nil |
| Cardwell ... ... | 3·69 | 27 | 0·47 | 6·20 | Woodford ... ... | 3·02 | 27 | 2·57 | 3·68 |
| Cooktown ... ... | 2·92 | 27 | 0·81 | 6·27 | Yandina ... ... | 4·85 | 21 | 3·69 | 7·91 |
| Herberton ... ... | 1·60 | 27 | 0·87 | 1·59 | | | | | |
| Ingham ... ... | 3·47 | 22 | 0·67 | 7·69 | *Darling Downs.* | | | | |
| Innisfail ... ... | 13·25 | 27 | 6·74 | 15·76 | | | | | |
| Mossman ... ... | 2·10 | 5 | 0·59 | 5·41 | Dalby ... ... | 1·48 | 27 | 0·52 | 1·09 |
| Townsville ... ... | 1·46 | 30 | 0·36 | 0·60 | Emu Vale ... ... | 1·12 | 17 | 1·63 | 2·98 |
| | | | | | Jimbour ... ... | 1·41 | 24 | 0 53 | 1·08 |
| *Central Coast.* | | | | | Miles ... ... | 1·79 | 27 | 1·00 | 1·02 |
| | | | | | Stanthorpe ... | 1·75 | 27 | 2·64 | 3·81 |
| Ayr ... ... ... | 1·22 | 27 | 0·34 | 0·39 | Toowoomba ... | 2·27 | 27 | 2·24 | 3·82 |
| Bowen ... ... | 1·43 | 27 | 0·13 | 0·47 | Warwick ... ... | 1·61 | 27 | 4·00 | 3·93 |
| Charters Towers ... | 0·91 | 27 | Nil | 0·20 | | | | | |
| Mackay ... ... | 4·19 | 27 | 1·19 | 3·08 | | | | | |
| Proserpine ... | 6·11 | 11 | 1·25 | 4·06 | *Maranoa.* | | | | |
| St. Lawrence ... | 1·97 | 27 | 0·86 | 0·28 | | | | | |
| | | | | | Roma ... .... | 1·51 | 25 | 1·43 | 1·18 |
| *South Coast.* | | | | | | | | | |
| | | | | | *State Farms, &c.* | | | | |
| Biggenden ... ... | 2·09 | 14 | 0·73 | 0·96 | | | | | |
| Bundaberg ... ... | 2 93 | 27 | 1·82 | 0·96 | Gatton College ... | 1·96 | 14 | 1·96 | 2·25 |
| Brisbane ... ... | 2·97 | 64 | 2·48 | 3·60 | Gindie .. ... | 1·11 | 13 | 1·42 | 0·01 |
| Childers ... ... | 2·59 | 19 | 0·45 | 1·14 | Kamerunga Nurs'y | 4·37 | 23 | 2·33 | 3·80 |
| Crohamhurst ... | 5·30 | 22 | 3·78 | 6·32 | Kairi ... ... | ... | ... | 0·60 | 1·87 |
| Esk ... ... ... | 2·29 | 27 | 0·82 | 2·71 | Sugar Experiment | | | | |
| Gayndah ... ... | 1·74 | 27 | 1·60 | 0·67 | Station, Mackay | 3·81 | 16 | 2·12 | 3·89 |
| Gympie ... ... | 2·83 | 27 | 2·52 | 1·96 | Bungeworgorai ... | 1·29 | 2 | 1·14 | 1·43 |
| Glasshouse M'tains | 2·82 | 6 | 7·28 | 5·27 | Warren ... ... | 0·63 | 2 | 1·26 | Nil |
| Kilkivan ... ... | 2·25 | 27 | 1·07 | 0·40 | Hermitage ... | 0·91 | 7 | 1·98 | 3·49 |
| Maryborough ... | 3·08 | 27 | 2·18 | 1·82 | | | | | |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for May this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

# The Orchard.

## PINEAPPLE PROPAGATION.

By G. WILLIAMS, Cairns.

As at least two of the most esteemed local pines have originated in this State, reputably from sports, there appears rather more than a possibility that further improvement may be effected by raising new varieties from seeds. The smooth-leaf type, three varieties of which are known in this part of the State, admits of improvement in several directions, and this can most likely be accomplished in the manner indicated, particularly where care is exercised in fertilising—a rather slow but not laborious process. Fertilising may be confined to the lower half of the fruit, as it is seldom that seeds are produced beyond the centre. The Northern climate is particularly adapted for the furtherance of this object, but the horticultural possibilities are almost totally unrecognised. The principal drawbacks to this system of propagation, as applied to pines, is their general freedom from fertile seeds, consequently seedling plants are very rarely seen. The same principles, however, apply to pines as to other forms of vegetation, a stoppage or reduction of supplies inducing efforts towards reproduction. Though the practice does not seem readily applicable, still it is borne out in practice, thirty plants being raised from seed contained in six fruits, three rough and three smooth leaf, about 40 per cent. of seed proving infertile. The system entails very little trouble, merely removing that part of the plant, as with suckers for planting in earlier stages, immediately the first sign of fruit production is noted, and replanting in the ordinary manner. The deprivation of young plants of original source of supply from the parent roots has the desired effect, and fertilising of flowers may follow, if so desired as development progresses. The seeds, in appearance somewhat resembling those of an apple, will be found just beneath the skin of the fruit. They should be planted without unnecessary delay—preferably in seed-boxes. Germination is rather irregular, and growth for the first season slow. If young plants are by any means crowded, they should be picked out and replanted in light soil, contained in shallow boxes, at intervals of four to six inches. This will allow for sufficient development until far enough advanced to plant in the open, which, for several reasons, is inadvisable in the early stages. In about twelve months from planting the seed, the young pines will be sufficiently developed, and with good root growth, to plant in permanent positions where the quality can be determined. Three years may reasonably be accepted as a fruiting age. It was originally contended that the fruit of the Northern climate was invariably inferior. This contention, however, has no foundation in fact, as the plants exhibit greater vigour and

productiveness than in colder localities. Inferior types subject to general neglect had evidently created an erroneous impression. The fruit attains a large size under fair cultivation, is of fine quality, and fully flavoured. Smooth-leaf pines have, in one instance, attained a weight of 16 lb.; and pines of 10 to 14 lb. weight are not by any means exceptional. But the very large fruit are of too soft a nature to stand without damage their own weight, and are consequently not adapted for transport. In this direction there is opportunity for speculation and improvement by crossing with the firmer fleshed rough-leaf.

## ERADICATING BANANA STOOLS.

"Old banana stalks," says Mr. Brünnich, Agricultural Chemist, "and stools contain very large amounts of fertilising materials, which should be returned to the soil. It would be the greatest mistake to poison such stools, as the quantity of poison required would injure the soil. The stools must be dug out, and allowed to rot on the ground, to return humus and mineral matters to the soil, and a sandy soil requires this more particularly."

The most wasteful methods of utilising lands for banana culture in North Queensland are adopted by the Chinese, and also by some European planters in the North and South. The general practice is to grow bananas on the same land continuously without the addition of manure to supply the loss of nitrogen and potash removed by the plants, and which are so vitally important to the production of heavy crops. The idea seems to be that the plantations are sufficiently renovated by cutting up the stems which have already borne fruit and leaving them to rot round the clumps of plants; but this is not only wholly insufficient, but has the great disadvantage of affording a safe breeding-place for many noxious insects and other pests. What should be done on a well-ordered plantation is, either to replant entirely after the sixth year, thus enabling the land to receive a thorough ploughing and manuring, or to rotate with some other crop. What the rotation crop should be depends on the locality, since what may be a profitable crop in one district may be utterly unsuitable to another.

## GRAFTING PAPAW TREES.

Mr. C. Ross, Instructor in Fruit Culture, says that young seedling papaw-trees may be grafted when the stems are about 1 in. in diameter. He suggests the cleft graft as the most serviceable, but the graft must be carefully bound and waxed to prevent moisture penetrating the cleft. The scions should not be thicker than the stock, and these may be got from the side shoots along the old stems of female trees of a good bearing type.

## WHITE ANTS ATTACKING FRUIT-TREES.

White ants in fruit-trees in time of drought will make their way from the dead wood into the living, with results fatal to the trees or vines. One remedy for the pest is to discover their under or over ground nest, and pour in bisulphide of carbon, either allowing the fumes to destroy the insects or exploding the chemical. A small quantity of arsenious acid placed in the soil around the tree, without touching the trunk, is also efficacious. Or pieces of pine wood saturated with some white ant mixture, such as Street's, and buried close to the trees will effectually destroy them. Apterite chipped into the soil will destroy white ants and not hurt the trees. A short paragraph in "Garden and Field" for June, 1915, says that "entomologists recommend that the soil be well opened out round the trunk and main roots, and any damaged wood or dead roots carefully cut away, and any scars painted with tar or paint. German potash (kainit), if mixed with the soil round the roots and trunk, 3 or 4 lb. to a large tree, will drive the white ants away, and also act as a manure for the tree treated. All dead wood, stumps, and stakes should be cleared out of infested ground, and any nests that can be found should be burnt out.

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## BLACK HEART IN PINEAPPLES.

The Ripley Queen pineapple is more subject to black heart than other varieties, and the winter crop is more or less affected by it, the summer crop being usually free. Both rough and smooth varieties do well in the Redland Bay district, but black heart is known there as well as in other parts of the State. The Brisbane district is the best for rough varieties. Wet and cold weather is the principal cause of the disease. However, taking the industry as a whole, the percentage of loss from this cause is not very serious in the year's output, and should not discourage anyone from entering upon the pineapple-growing industry.

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## GROWING ORANGES AND MANDARINS.

Mr. C. Ross, Instructor in Fruit Culture, says that the main principles to be observed in growing the above fruits are, that varieties such as the Navel orange and Scarlet mandarin, which have a drooping or pendulous habit of growth, should have a stem at least 3 ft. high before the first branches to form the head are allowed to form, whereas, with such varieties as Joppa orange, or Emperor mandarin, which are upright growers, the head should be established near the ground, above the graft. Dense growers require to be well thinned out, and strong, open growers should have extra vigorous shoots shortened back. It should be remembered that lemons produce their crop on lateral shoots as well as on terminals.

# Horticulture.

## THE CULTIVATION OF SUNFLOWERS.

BY A. J. BOYD.

The Sunflower is one of the Compositæ and takes its origin from Central America. It is closely allied to the Jerusalem Artichoke. It will grow in almost any soil, and in any climate. It will withstand cold or heat, drought or rain. It is subject to no disease, and to no climatic disqualification.

### SOIL AND CULTIVATION.

Although the plant is not very particular as to soil, it thrives best on deep, well-drained loam. It is advisable to sow early, say at the beginning of September, and ending in February. The quantity of seed required is from 4 to 6 lb. per acre. This should be sown in drills, 5 ft. between the rows, and 10 to 18 in. between plants in the row. The plant grows very rapidly, the crop being usually ready for harvest in three months.

Prepare the land as for corn (maize) and cover the seed no deeper than 2 in. During the growth, the cultivation consists in keeping the land clean and well pulverised, so as to break the capillary pores of the soil, and thus retain the moisture in it. This is a very important point, as the Sunflower is one of the greatest known evaporisers of moisture. When the plant is full grown it will evaporate from 1½ to 2 lb. of water in 24 hours.

The Sunflower is, of course, grown for its seeds, which are very nutritious and contain a large quantity of oil. Thousands of acres in Russia are under this crop, and the yield of oil is estimated at from 40 to 50 per cent. of the total weight of the seeds. It is, in reality, much more, but, in the process of extraction, an important proportion of the oil remains, unfortunately, in the shelly seed envelopes. The seeds form a capital food for poultry, being nearly equal to buckwheat to induce hens to lay. The oil cake which remains after the extraction of the oil is, for feeding and manurial purposes, as valuable as linseed and cotton seed cake. The ash of the stalks, which often run up to 12 or 15 ft., is very rich in potash. Such ashes naturally form a capital manure and stimulant for plants requiring potash. The large leaves form an excellent green feed, greatly relished by all stock. In the large varieties, the flowers, or heads, as they are called, reach sometimes 18 in. in diameter. When the seeds are ripe, they are so thickly set that as many as 2,000 or 3,000 find place in a single head. These seeds are slightly wedge-shaped, and vary in colour, some being quite black, whilst others are grey or white streaked with black.

There are different varieties of the Sunflower, but the most profitable to grow is, undoubtedly, the Giant Russian, of which each head contains from 1,000 to 2,000 and even 3,000 seeds. It is closely followed by the black-seeded variety. It has been grown successfully under a great variety of circumstances and seasons in Queensland, and succeeded as well in the dry West as on the Downs and further North. It was found to do well on forest lands which are not too sticky.

A very necessary condition is, that the plants should be fully exposed to the sun, on which account European growers sow the seed in drills 5 ft. apart, and dibble the seed in at intervals of 3 ft., the plants being afterwards thinned out, because they have such an exuberant growth that they spread their branches and heads in successive layers over each other. This, however, does not apply to the Giant Russian variety, which, as already said, is the most profitable kind to grow commercially. Again, Sunflowers with many heads do not ripen the seed evenly; therefore it is best to cultivate a species which produces only one head to each plant. The Giant Russian is such a variety and may be planted closer than any other, and on suitable soil, and with good cultivation in its young stages, will yield up to 50 bushels per acre. When the plants are about 12 in. high, a slight hilling up benefits them very much.

## HARVESTING.

Some growers advise harvesting when the seed heads are quite ripe, but in countries like Russia and America, where the plant is grown on a large scale, the harvesting takes place before the seed is quite ripe, in order to avoid loss by "shattering"—that is, by the shedding of many of the seeds.

A very expeditious way to harvest is to cut the stems close to the ground by means of a horse corn-stalk cutter, and to cart home stems and heads together to the barn or drying shed. There the heads should be dried as quickly as possible by good ventilation and protection from damp, so as to avoid the formation of mouldiness in their fleshy parts and on the seeds. As soon as they are dry enough, they may be threshed with a flail, no special machinery having been put on the market for this work. When threshed, the seeds are winnowed. A simple winnowing machine is easily manufactured on the farm.

A bushel of Sunflower seed varies, according to the kind grown, from 25 to 35 lb., the average being about 30 lb.

The seed yields from 15 to 20 per cent. of oil by cold pressure. The stems may be ensiled and rendered palatable food for stock. The yield of green matter at the Maine, U.S.A., Experiment Station has been from 11,000 to 12,000 lb. per acre, containing from 2,000 to 2,700 lb. of dry matter. The price of Sunflower seed in Australia is about £15 per ton, so that a 40-bushel crop would, at 30 lb. weight per bushel, be worth about £7 10s. There is a good market for the product in this and in the Southern States.

## RAISING A YELLOW SWEET PEA.

In an article on this subject, the editor of "South African Gardening" mentions that a fortune awaits the man who can raise a pure yellow sweet pea, but it must be purest yellow, not even a light sulphur colour. Many hybridists are at present working to this end; but, so far, the pure yellow flower has evaded them. This should not discourage anyone from trying his hand at raising such a flower, for Nature may respond to your touch more readily than to the touch of another, and although the yellow sweet pea has not yet been raised, still the possibilities are there; in fact there are many who look upon the introduction of the yellow flower as being only a matter of time. There is not much chance of finding a yellow flower amongst your rows of fixed plants; it has got to be worked for methodically and determinedly, and the only way of raising a flower of this kind is by cross-fertilising two flowers which are likely to produce a yellow when combined. Let us first of all describe the process of cross-fertilisation.

### THE TIME TO FERTILISE.

The flower shown at B Fig. 1 is in the right state of development to be crossed, and the one next to it on the stem shows the time at which the anthers should be removed.

FIG. 1.

### CROSS-FERTILISATION EXPLAINED.

Before seed can be produced it is necessary that the flower should be fertilised. Fertilisation is effected by the pollen of the same flower or a flower of the same family coming in contact with the pistil. Some

flowers are self-fertilising, whilst others lend themselves to cross-fertilisation. The sweet pea, however, is a self-fertilising flower—that is to say, the pistil and stamens are both found in the same flower. Therefore, if we want to make a cross it is necessary to prevent self-fertilisation. This is done by taking the flower when it is still quite young and removing the anthers, just as the flower begins to show colour and the standard turns upright. This is easily done by taking the petal which surrounds the keel of the flower—*i.e.*, the bottom petal—between the thumb and the fingers, levering it at first slightly towards you, and finally in a downward direction; you will then find the anthers and the pistil exposed, and if you have taken the flower at a young enough stage the anthers will be solid little yellow lobes supported upon fine stems, both ten in number. The pistil will be seen as a stouter growth turning upwards at the end (see Fig. 2), and if it is examined closely it will be noticed to be covered with a quantity of fine hairs, for the purpose of catching the pollen grains, which in the ordinary course would burst from the anthers. But to cross-fertilise the pea you must remove all these anthers and push the petal, that you have pulled down, back into its proper position; let this stand for two days, and now take a more advanced flower of another variety, again pull down the petal as before, and, holding it upside down, work the pollen of the second flower on to the pistil of the first flower from which you have removed the anthers. This pollen should be a bright yellow colour to be in a proper condition for fertilisation, and when the pistil is more or less covered, the petal that has been pulled down is again allowed to take its natural position, and the flower is labelled and watched.

Some believe in tying the flower in a muslin sack to prevent bees and insects interfering with the cross, by carrying pollen from other flowers on to the one hybridised. But speaking from experience I may safely say that I think this absolutely unnecessary and in fact detrimental to the production of a really good hard seed.

## NOTING THE CROSS AND ITS RESULTS.

This is very important, and must be carefully done; the best means is to keep a note of all the crosses made and to label each flower in this way—

A1 × F4. The letter will represent a colour; suppose we make A represent blue and F pink, the numbers will represent the names of varieties used. In this case we might say that Flora Norton Spencer has been worked on to Countess Spencer; these are shown in the notebook in this way: A1 × F1, Flora Norton Spencer × Countess Spencer, and under the heading A × F you should keep all the blue hybridised on to pinks. This gives us a complete and easily followed record of our experiments, and when we have learnt the letters we have assigned to different colours we can tell at a glance what kind of a cross was made, only referring to the book to find out the particular varieties used. When the seed is collected always keep it carefully labelled and sown separately next year.

## PISTIL AND ANTHERS.

Fig. 2 shows a flower with all the petals removed; also a section of the flower with anthers, and a section with the anthers removed.

## CROSSING TWO SWEET PEAS.

Fig. 3 shows a flower with the anthers removed and pistil developed; shows same flower with the anthers of another flower being brushed against the pistil, which will collect the pollen, and so become fertilised and bear seed.

FIG. 2.

FIG. 3.

## THE FIRST YEAR AFTER CROSSING.

The results during the first year after crossing will no doubt be very disappointing to those who have never tackled this kind of work before, for the flowers usually consist of ugly blue, maroon, and mauve shades, but seed from these must be saved for another season, and the next time it flowers many colours and forms will be found to result from the same cross. Seed should be saved again from the various plants separately—*i.e.*, the various breaks must be kept to themselves, but flowers showing the same form may be collected together.

Now comes the roguing process, for the seeds that are sown will throw back when grown next year, but if these rogues are carefully taken out, the next year's sowing should give you a practically pure stock and the result of your cross. There may be a few rogues in it, but not many. These, of course, must be carefully removed until the stock is quite true.

## VARIETIES TO CROSS.

Opinions differ as to the most likely colours to give yellow, but my experience points to varieties with the colour of Helen Lewis crossed

with dark colours, such as King Manoel, or even scarlet varieties, such as Scarlet Emperor. Another likely cross would be, say, Edith Taylor or a similar variety crossed with a blue. I know these colours are not the one that many experts would recommend as being the most likely to give yellow flowers, but about five years ago out of a great number of crosses I made these gave the nearest approach to yellow. The work of hybridising and roguing looks a big task when it is put into writing, but it is really very simple and intensely interesting. Added to this there is an excellent chance of making quite a considerable sum of money at any moment.

[We asked two sweet-pea growers if they had ever seen a pure yellow sweet pea in Queensland or elsewhere. Both said they had. We have never seen one ourselves. In 1885 Mr. Eckford evolved the Orange Prince variety. The Robert Sydenham is a magnificent orange self, and is described as of the best waved Spencer form. The pure orange yellow has not yet been obtained, although, as far as yellow is concerned, sweet peas of a pale buff or sulphur colour have been raised.—Ed. "Q.A.J."]

## SWEET PEA NOTES.

Don't overfeed the plants before the blooms appear.

Manuring with rich nitrogenous manures—sulphate of ammonia, nitrate of soda, and fowl manures—makes a very rank growth which is susceptible to the dreaded "streak" disease. This disease usually appears just at blooming time.

Make the plants hardy. The winter ones will grow slowly until the warm spring months. Do not feed these until then. Use the hoe to keep weeds down.

We have never been troubled with streak. We ascribe our "luck" to the fact that we use very few nitrogenous manures. A little super and well-rotted stable manure well worked into the soil are quite sufficient in most cases to secure good flowers

## STRAWBERRY CULTURE.

The strawberry will do well in the vegetable garden if planted out early enough. The soil must be well prepared. Trenching is almost necessary in most soils. Use well-rotted stable manure. Take out drills 2 ft. apart and 1 ft. deep; place well-rotted stable manure and some super at the bottom. Cover over again with soil. Plant strawberry runners on the top of the drills, spacing them 18 in. apart. Set the runners in firmly, spreading out the roots with the crowns just on the surface. May and June are the best months for setting out. If planted early you may expect a crop the same season. No weeds must be allowed to grow near the plants.

As soon as the spring approaches, loosen the soil and spread straw rather thickly around the plants. This will keep the fruit clean and will also act as a mulch for the bed. Don't use a litter that will fill the ground with weeds (the greatest enemy to successful strawberry culture).

Soon after the fruiting season is over runners will appear. All except those required for fresh planting must be cut away.

When rooted the runners may be severed from the parent plant.

Some growers space the strawberry plants in rows 4 ft. apart, and allow all the runners to grow between the parent plants, forming a matted bed 4 ft. wide.

The strawberry responds to irrigation, and most profitable crops are grown under such favourable condition. A north-easterly slope is the best aspect to secure early crops.

No plant is more profitable to grow and none more readily responds to good cultivation than the strawberry.

A small area well tilled and cared for will yield better fruits than large ones allowed to run wild.

The best varieties are Melba, Sunbeam, Royal Sovereign, Edith, and Federation.

[The above useful hints on strawberry-growing from "Garden and Field," as well as those on sweet pea culture from the same source, come just at the time when information on these subjects is constantly being asked for. The manuring of sweet peas is not generally understood by amateur gardeners, who in most cases cause injury, and even disease, to young plants by a too free use of nitrogenous manures with a view to forcing them into rapid growth. In this State, sweet peas have been largely sown in numbers of city and suburban gardens, especially in the South, and the hints given as above, if followed, will have a beneficial effect.—Ed. "Q.A.J."]

## CURE FOR WORMS IN HORSES.

Mr. J. F. Keane, Carbeen, writes: "It is more than twenty years since anyone saw a horse of mine that had been a week in my possession troubled with worms. Wherever I am, I always have a few sunflowers growing, even if I have to water them. A handful of the leaves given to a horse once a month keeps him quite free from intestinal worms. I think it is the spicules on the leaf that act as a simple mechanical vermicide." This is a very simple remedy, and one worth experimenting with.

# Botany.

## CONTRIBUTIONS TO THE FLORA OF QUEENSLAND.

By F. MANSON BAILEY, C.M.G., F.L.S., Colonial Botanist.

### Order JUNCACEÆ.

XANTHORHÆA, Sm.

**X. media,** *R. Br. Prodr.* 288. This species approaches very closely to *X. hastilis, R. Br.*, but it seems necessary to retain it as a distinct species on some small differences. Stem rather short, leaves long, ancipitous. Inflorescence as in *X. hastilis*, but the bracts and perianth segments not bearded.

Hab.: Forest country, North Pine, *E. W. Bick*, April, 1915. Produces a fair amount of resin.

**X. quadrangulata,** *F. v. M.* This has been collected in different localities by Mr. E. W. Bick (Gympie road, near Brisbane, Sunnybank, Mount Debatable, and Springsure), and said to be abundant in all, so that it would appear to be one of our commonest species. It is a good yielder of resin.

ADIANTUM, Lim.

**A. Whitei,** *Bail.*, n. sp. (Plate 5.) Rhizome creeping. Stripes and rhachis hispid. Fronds $\frac{3}{4}$ to $1\frac{1}{2}$ ft. high, mostly bipinnate but slightly tripinnate at the base. Primary pinnæ numerous, always simply pinnate at the end. Pinnules numerous, usually small, $\frac{1}{4}$ to $\frac{1}{2}$ in. long, the under surface with a few scattered hairs or bristles. Sori not very abundant. Indusia orbicular or somewhat reniform.

Hab.: Kenmore, *J. E. Young* and *C. T. White*, July, 1914; *C. T. White*, May, 1915.

In its hispid nature this new species approaches *A. hispidulum, Swartz.* It is well worthy of garden culture.

### Order HEPATICÆ.

**Lepidozia lateconica,** *Stephani.*

Hab.: Barron Falls, *Mrs. Brotherton.*

### Order FUNGI.

**Polyporus australiensis,** *Wakefield.*

Hab.: Coomera River, on logs. *Tryon* and *White.*

PLATE 5.—ADIANTUM WHITEI, *Bail.*

# Plant Pathology.

## PANAMA DISEASE OF BANANAS.

The "Journal of the Jamaica Agricultural Society" (December, 1914), referring to the measures taken in the United States of America to stamp out foot-and-mouth disease in cattle and swine, says:—

"A general spread of Panama disease among our bananas here would be of more consequence to us than the wiping out of cattle, &c., in the United States by foot-and-mouth disease, so we ask the support and help of all our readers in preventing the spread of Panama disease where it has occurred and wherever it may occur. We ask our readers for their co-operation, and we particularly ask the co-operation of our branch societies and all their members individually—to learn all they can from the instructors about the symptoms of Panama disease, and to keep a sharp lookout for any possible cases. So many men have been coming from Costa Rica that it would be wonderful if we escaped infection. The germs can be carried on the soles of a man's working boots or on his cutlass if he brings one back with him unknown to the Customs authorities. Infection can be carried from field to field by men walking past an infected root. It can be carried by men taking cocoes or any such roots from an infected field to another field; a cutlass used on an infected plant would certainly carry it to another plant if used again without disinfection.

"Here is what was done by a farmer in an infected district in the United States to save his herd when foot-and-mouth disease broke out. At the first outbreak of this disease he rigidly quarantined his entire premises, allowing no one to enter or leave. The cattle were kept continually in the barns, and the men who cared for them were compelled to wade through a strong disinfecting solution each time both before entering and leaving the stable. In addition, the stalls, floors, utensils, and manure were repeatedly sprayed with the disinfecting solution.

"Where this disease (foot-and-mouth) breaks out among cattle, the entire herd is slaughtered—*i.e.*, every animal on the premises is killed and buried in quicklime, the local State paying half of the cost and the Government half.

"We should do something like this with Panama disease. We can afford to run no risks. Every place this disease breaks out should be thoroughly quarantined, and no one should be allowed to go into or out of the field except by necessity, and then they should wash their hands and feet, or dip their boots in a strong disinfecting fluid; the cutlass used should be passed through fire; all the bananas in the case of a small place should be utterly destroyed and burned; and on a large place a wide area around any infected place should be kept under

quarantine, and fenced with close-mesh wire so that no fowl or pig can go in or out. Pigs would probably carry the disease worst of all. It must be noted that Panama disease is a soil disease, and the germs are in the soil and pass through the soil. It is not the stems of the bananas alone that must be destroyed, but all the roots which may spread 16 ft. around.

"We hope our readers will recognise the seriousness of this matter and not treat it lightly."

With reference to the so-called "Panama disease of bananas," H. Tryon, Government Entomologist and Vegetable Pathologist to the Department of Agriculture and Stock, Queensland, wrote, in general terms, in 1914 on "Root Disease of the Banana in Queensland," as a contribution to an article by us on "The Banana in Queensland" (Bulletin, Queensland Department of Agriculture, 1914). In this he stated as follows:—"The root disease, as hereinafter described, is evidently identical with or is closely related to the malady that attacks with special virulence the Gros Michel variety in Central America, and in some of the West Indian Islands (Cuba, Jamaica, Surinam), and is known generally as 'the Panama disease.'" He does not, as we now learn, favour the view advanced by S. F. Ashby (1913) that this disease is caused by a parasitic fungus belonging to the genus *Fusarium* growing in the tissue, but finds some evidence that the malady is primarily due to bacteria, and that the mycelium of *Fusarium* pervades the spiral vessels, the scene of the activity of these, and for whose growth therein they have "paved the way."

## BAIT FOR CUTWORM.

The Superintendent of Entomology, Honolulu, Hawaii, in his report for 1914, dealing with plant pests, advises that, for the destruction of the cutworm, the following may be used with good results:—

Mix Paris green or white arsenic dry with bran; add molasses and just enough water to moisten the mass. The proportions of the ingredients are—Paris green or white arsenic, 1 lb.; molasses, ½ gallon; bran, 20 lb. Place the mixture in rows in the infected field. Frequent rain will make it necessary to repeat the operation. The mixture should be placed between rather than on the plants. Care must be taken to keep domestic animals out of fields treated in this manner.

In the case of houses, bush-houses, &c., infested by

BLACK ANTS,

he says that these may be so reduced in numbers as to give very little trouble for some time by trapping them with sponges moistened with either sweetened water or diluted bouillon, and placed where the ants swarm. After the sponges are covered with ants, they can be dropped into boiling water, cleaned, and the process repeated.

# General Notes.

## ROSELLA, JAM, JELLY, AND WINE.

To every pound of shell, allow about 1 lb. of sugar. A little water. When making rosella jam it is necessary to separate the shell from the pod. Tie the pods up in a piece of mosquito net, and put them into the preserving pan with the rosellas, sugar, and water. Allow this to stand by the fire for an hour, where it is just hot enough to bring them slowly to a boil. Simmer gently for an hour and a-half or two hours. Then take out the pods, let the jam cool, and then put into preserve jars.

### ROSELLA JELLY.

To every pint of juice add 1 lb. of sugar and a little water. When making the jelly there is no occasion to pick them; you can put them in the preserving pan just as you get them, with a little water to every pint of fruit. Allow it to boil for two or three hours, then strain it through a sieve. Put 1 lb. of sugar to every pint of juice, and put this back in the preserving pan, and boil for an hour or until it jellies in a saucer. When cool, fill the preserve jars, and when cold fasten them up securely.

### ANOTHER RECIPE FOR JELLY.

One cupful of the pod to 3 pints of the shell. Enough water to float the rosellas. Boil until soft; strain off the juice, and replace in the pan with 1 lb. of brewers' crystals to each pint of juice. Boil for about three-quarters of an hour, skimming well; and make sure, by dropping a little on a plate (before removing it from the fire), that it will be jelly when cold.

### ROSELLA WINE.

Put the fruit into a cask that has one head out. Pour boiling water over the fruit; rather more than enough to cover it. Let this stand for about three days; stir now and again. At the end of three days strain the liquor into another cask—this cask to have both heads in. Then, for every gallon liquor take 3 lb. of sugar, and make a good thick syrup of the same. Pour this syrup while hot into the liquor, and stir well. Leave the cask with the bung out until fermentation starts. Should this not occur in, say, twenty-four hours, add a bottle of yeast. Keep this cask in as even a temperature as possible, as this will help the fermentation. In the process of fermentation you will lose some of your liquor. Should it ferment thoroughly, save the liquor that overflows from the bunghole, and put it back in the cask; but should this not suffice to keep the cask full, add a little warm water. When the liquor has almost finished fermenting—say when it stands at 3 degrees density by the Beaumé saccharometer—bung up the cask and leave for three months. Then bottle.

## SCARCITY OF POTASH.

Potash being no longer obtainable by fruit-growers and others on the land, Mr. J. C. Brünnich, Agricultural Chemist, advises in the meantime to apply wood ashes and compost, and also limestone screenings, at the rate of about 2 tons per acre, which will liberate some potash from the soil.

## A WEATHER GLASS

Which any farm boy can make with a few simple materials, is explained in the "Farmers' Gazette."

Make up the following mixture:—Camphor, 2½ drachms; alcohol, 11 drachms; water, 9 drachms; and 38 grains each of saltpetre and sal-ammoniac. Pour this mixture into a tall, narrow bottle of clear glass, and not less than 7 in. in height. Close the bottle either with a cork or with a piece of parchment tied round its neck. A pin-hole must be made so as not to exclude atmosphere. From day to day the appearance of the solution varies considerably according to the state of the atmosphere. When the conditions are likely to be fine and dry, the solid elements collect together at the bottom of the bottle, and all the upper part is clear. At the approach of rain, the solid particles take on a beautiful feathery formation, which spreads upwards through the clear liquid, making a pretty effect. As the conditions become increasingly stormy, the feathery growth extends till the whole of the interior of the bottle is filled with beautiful sprays. In the case of a very high wind or a sudden electrical outburst, the sprays tend to concentrate at the top of the bottle just below the cork. The storm glass, as a rule, gives good warning of a coming change, usually twenty-four hours in advance, and a study of the variations of the growth will soon acquaint the owner with the meaning of the different phases, so that a good idea of the coming weather may be ascertained. For the most perfect working, it will be found that the storm glass should not be placed on a mantel-shelf, or anywhere near a fire; and, on the whole, the best possible position will be in a window. Here the device can be readily observed, and at the same time it is fairly well in touch with the conditions out of doors.

## PASSION-FRUIT PULP.

It should be quite a simple matter, says the "Farm Gazette," to install a small home-canning outfit and pulp passion-fruit. The following recipe has been tried and found successful by the New South Wales Department of Agriculture at its Wagga orchard:—The fruit should be ripe and sweet. Remove the pulp and place in tins, solder down the lids, then exhaust for five minutes in boiling water, solder up hole in lide, and reboil for twenty minutes; then remove and allow to cool. It requires 2 lb. of passion-fruit to make 1 lb. pulp.

## TIME DURING WHICH CROPS OCCUPY THE GROUND.

Maize: 4 to 6 months, according to the variety sown.

Potatoes: 8 to 16 weeks, the former period only apply to varieties which mature very quickly.

Barley: 5 to 6 months.

Oats: 5 to 6 months.

Wheat: 5 to 6 months.

All the above periods may be taken as approximate only, and are more or less affected by the variety of the respective crops planted, their environment, and the season experienced.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JUNE, 1915.

| Article. | | JUNE. Prices. |
|---|---|---|
| Bacon | lb. | 8d. to 10½d. |
| Bran | ton | £12 10s. |
| Butter | cwt. | 205s. |
| Chaff, Mixed | ton | £7 5s. to £8 10s. |
| Chaff, Oaten | ,, | £9 5s. to £10 |
| Chaff, Lucerne | ,, | £9 15s. to £13 |
| Chaff, Wheaten | ,, | £5 5s. |
| Cheese | lb. | 1s. |
| Flour | ton | £19 10s. |
| Hams | lb. | 1s. to 1s. 1d. |
| Hay, Oaten | ton | £16 |
| Hay, Lucerne (Prime) | ,, | £7 to £11 |
| Honey | lb. | 3d. to 3½d. |
| Maize | bush. | 5s. 3d. to 5s. 10d. |
| Oats | ,, | 6s. 6d. to 7s. 6d. |
| Onions (Victorian) | ton | £9 |
| Peanuts | lb. | 3d. to 3½d. |
| Pollard | ton | £13 10s. |
| Potatoes | ,, | £9 to £10 |
| Potatoes (Sweet) | cwt. | 3s. 6d. to 4s. 4d. |
| Pumpkins | ton | £5 to £5 10s. |
| Eggs | doz. | 1s. 9d. to 2s. 8d. |
| Fowls | pair | 2s. 9d. to 3s. 6d. |
| Ducks, English | ,, | 2s. to 3s. 3d. |
| Ducks, Muscovy | ,, | 3s. 6d. to 5s. |
| Turkeys (Hens) | ,, | 6s. to 8s. 6d. |
| Turkeys (Gobblers) | ,, | 9s. to 14s. |
| Wheat | bush. | 8s. |

### VEGETABLES.

| | | |
|---|---|---|
| Cabbages | per dozen | 4s. to 11s. 6d. |
| Peas | per sugar bag | 6s. to 12s. |
| Beans | ,, ,, | 9s. to 14s. |
| Carrots | per dozen bunches | 1s. to 1s. 6d. |
| Cucumbers | per dozen | ... |
| Custard Marrows | ,, | 2s. 6d. to 5s. 9d. |
| Vegetable Marrows | ,, | 2s. 6d. to 5s. 9d. |
| Beetroot | per dozen bunches | 1s. to 1s. 6d. |
| Chocos | per quarter-case | 2s. to 2s. 9d. |
| Sweet Potatoes | per cwt. | ... |
| Table Pumpkins | per ton | £4 10s. |
| Tomatoes | per quarter-case | 8s. 3d. |
| Turnips | per dozen bunches | 1s. to 1s. 4d. |
| Rhubarb | per bundle | 1s. to 1s. 6d. |
| Lettuces | per dozen | ... |

## SOUTHERN FRUIT MARKETS.

| Article. | JUNE. Prices. |
|---|---|
| Bananas (Queensland), per case | 15s. to 18s. |
| Bananas (Fiji), per case | 26s. |
| Bananas (G.M.), per case | ... |
| Mandarins, per case | 5s 6d. to 6s. |
| Oranges (Navel), per case | 14s. to 15s. |
| Oranges (Other), per case | 6s. 6d. to 12s. |
| Passion Fruit, per half-case | 1s. 6d. to 7s. |
| Papaw Apples, per half-case | ... |
| Pineapples (Queens), per case | 8s. to 12s. |
| Pineapples (Ripleys), per case | 5s. to 9s. |
| Pineapples (Common), per case | 5s. to 9s. |
| Tomatoes, per quarter-case | 5s. to 6s. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | JUNE. Prices. |
|---|---|
| Apples (Tasmanian), Eating, per case | 7s. to 10s. |
| Apples (Local), per case | 6s. to 8s. |
| Apples, Cooking, per case | 6s. to 7s. |
| Apricots, per quarter-case | ... |
| Bananas (Cavendish), per dozen | 3d. to 5½d. |
| Bananas (Sugar), per dozen | 2½d. to 4d. |
| Cape Gooseberries, per quarter-case | ... |
| Cherries, per quarter-case | ... |
| Cocoanuts, per sack | 12s. to 15s. |
| Custard Apples, per quarter-case | 3s. 6d. to 5s. |
| Granadillas, per quarter-case | 2s. to 3s. |
| Lemons (Local), per case | 3s. to 5s. |
| Lemons (Italian), per case | 9s. |
| Mandarins, per half-case | 4s. to 9s. |
| Mangoes, per quarter-case | ... |
| Nectarines, per quarter-case | ... |
| Oranges (Navel), per case | 6s. 6d. to 7s. 6d. |
| Oranges (other), per case | 3s. 6d. to 6s. |
| Papaw Apples, per quarter case | 1s. 6d. to 2s. 8d. |
| Passion Fruit, per case | 2s. to 4s. |
| Peaches, per quarter-case | ... |
| Peanuts, per pound | 3d. to 3½d. |
| Pears (Victorian), per case | 8s. to 11s. |
| Rosellas, per sugar bag | 1s. to 2s. 6d. |
| Persimmons, per quarter-case | ... |
| Pineapples (Ripley), per case | 1s. 6d. to 3s. |
| Pineapples (Rough), per dozen | 9d. to 1s. 6d. |
| Pineapples (Smooth), per dozen | 3s. to 5s. |
| Strawberries, per tray | ... |
| Strawberries, per dozen boxes | ... |
| Tomatoes, per quarter-case | 6s. to 8s. 3d. |

## TOP PRICES, ENOGGERA YARDS, MAY, 1915.

| Animal. | MAY. Prices. |
|---|---|
| Bullocks | £14 to £18 |
| Cows | £10 7s. 6d. to £12 15s. |
| Merino Wethers | 25s. 3d. |
| Crossbred Wethers | 26s. 3d. |
| Merino Ewes | 19s. 6d. |
| Crossbred Ewes | 23s. 9d. |
| Lambs | 23s. |
| Pigs (Porkers) | 39s. |

## LONDON QUOTATIONS.

| Article. | | JUNE. Prices. |
|---|---|---|
| Danish Butter | cwt. | 144s. to 146s. |
| Cotton | lb. | 5·25d. |
| Hemp | ton | £32 15s. |
| Rubber (Fine hard Parà) | lb. | 2s. 7⅜d. |
| Rubber, Plantation | „ | 2s. 4⅜d. |
| Copra, South Sea | ton | £22 |

# TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

COMPUTED BY D. EGLINTON, F.R.A.S.

| Date. | MAY. | | JUNE. | | JULY. | | AUGUST. | |
|---|---|---|---|---|---|---|---|---|
| | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·14 | 5·17 | 6·31 | 5·0 | 6·39 | 5·3 | 6·30 | 5·18 |
| 2 | 6·14 | 5·16 | 6·31 | 5·0 | 6·39 | 5·3 | 6·30 | 5·18 |
| 3 | 6·15 | 5·15 | 6·32 | 5·0 | 6·39 | 5·3 | 6·29 | 5·19 |
| 4 | 6·15 | 5·14 | 6·32 | 5·0 | 6·40 | 5·4 | 6·28 | 5·20 |
| 5 | 6·16 | 5·13 | 6·33 | 4·59 | 6·40 | 5·4 | 6·27 | 5·21 |
| 6 | 6·17 | 5·12 | 6·33 | 4·59 | 6·40 | 5·4 | 6·27 | 5·21 |
| 7 | 6·17 | 5·12 | 6·34 | 4·59 | 6·40 | 5·5 | 6·26 | 5·21 |
| 8 | 6·18 | 5·11 | 6·34 | 4·59 | 6·40 | 5·5 | 6·25 | 5·22 |
| 9 | 6·18 | 5·11 | 6·34 | 4·59 | 6·40 | 5·5 | 6·24 | 5·22 |
| 10 | 6·19 | 5·10 | 6·35 | 4·59 | 6·40 | 5·6 | 6·24 | 5·22 |
| 11 | 6·19 | 5·10 | 6·35 | 4·59 | 6·39 | 5·6 | 6·23 | 5·23 |
| 12 | 6·20 | 5·9 | 6·35 | 4·59 | 6·39 | 5·6 | 6·23 | 5·23 |
| 13 | 6·20 | 5·9 | 6·35 | 4·59 | 6·39 | 5·7 | 6·22 | 5·24 |
| 14 | 6·20 | 5·8 | 6·36 | 4·59 | 6·39 | 5·7 | 6·21 | 5·25 |
| 15 | 6·21 | 5·8 | 6·36 | 5·0 | 6·38 | 5·8 | 6·20 | 5·26 |
| 16 | 6·21 | 5·7 | 6·36 | 5·0 | 6·38 | 5·8 | 6·19 | 5·26 |
| 17 | 6·22 | 5·6 | 6·37 | 5·0 | 6·38 | 5·9 | 6·18 | 5·26 |
| 18 | 6·22 | 5·5 | 6·37 | 5·0 | 6·37 | 5·10 | 6·17 | 5·27 |
| 19 | 6·23 | 5·5 | 6·37 | 5·0 | 6·37 | 5·11 | 6·16 | 5·27 |
| 20 | 6·23 | 5·4 | 6·38 | 5·0 | 6·36 | 5·12 | 6·15 | 5·27 |
| 21 | 6·24 | 5·4 | 6·38 | 5·0 | 6·36 | 5·12 | 6·14 | 5·28 |
| 22 | 6·24 | 5·4 | 6·38 | 5·0 | 6·36 | 5·12 | 6·13 | 5·28 |
| 23 | 6·25 | 5·3 | 6·38 | 5·0 | 6·35 | 5·13 | 6·12 | 5·29 |
| 24 | 6·25 | 5·3 | 6·38 | 5·1 | 6·35 | 5·13 | 6·11 | 5·29 |
| 25 | 6·26 | 5·3 | 6·39 | 5·1 | 6·35 | 5·13 | 6·10 | 5·30 |
| 26 | 6·26 | 5·2 | 6·39 | 5·1 | 6·34 | 5·14 | 6·9 | 5·30 |
| 27 | 6·27 | 5·2 | 6·39 | 5·2 | 6·34 | 5·14 | 6·8 | 5·31 |
| 28 | 6·28 | 5·2 | 6·39 | 5·2 | 6·33 | 5·15 | 6·7 | 5·31 |
| 29 | 6·29 | 5·1 | 6·39 | 5·2 | 6·32 | 5·16 | 6·6 | 5·32 |
| 30 | 6·30 | 5·1 | 6·39 | 5·3 | 6·31 | 5·17 | 6·5 | 5·32 |
| 31 | 6·30 | 5·1 | ... | ... | 6·31 | 5·17 | 6·5 | 5·33 |

## PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 6 May | ☽ | Last Quarter | 3 | 22 | p.m. |
| 14 „ | ● | New Moon | 1 | 31 | „ |
| 22 „ | ☾ | First Quarter | 2 | 50 | „ |
| 29 „ | ○ | Full Moon | 7 | 33 | a.m. |

The moon will be at its brightest not only when full, but because it will this month be at its least distance from the earth at that time.

| | | | | | |
|---|---|---|---|---|---|
| 5 June | ☽ | Last Quarter | 2 | 32 | a.m. |
| 13 „ | ● | New Moon | 4 | 57 | „ |
| 21 „ | ☾ | First Quarter | 12 | 24 | „ |
| 27 „ | ○ | Full Moon | 2 | 27 | p.m. |

The moon will be at its greatest distance from the earth on 11th June at 10 a.m., and nearest on the 26th at midday.

| | | | | | |
|---|---|---|---|---|---|
| 4 July | ☽ | Last Quarter | 3 | 54 | p.m. |
| 12 „ | ● | New Moon | 7 | 30 | „ |
| 20 „ | ☾ | First Quarter | 7 | 9 | a.m. |
| 26 „ | ○ | Full Moon | 10 | 11 | p.m. |

The moon will be at its greatest distance from the earth on 8th July, about 9 p.m. and at its nearest on the 24th at 3·24 p.m.

| | | | | | |
|---|---|---|---|---|---|
| 3 Aug. | ☽ | Last Quarter | 7 | 27 | a.m. |
| 11 „ | ● | New Moon | 8 | 52 | „ |
| 18 „ | ☾ | First Quarter | 12 | 17 | p.m. |
| 25 „ | ○ | Full Moon | 7 | 40 | a.m. |

The moon will be at its greatest distance from the earth on 5th August at 36 minutes after 12, midday, and at its nearest on the 20th about midnight.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes, respectively, later than at Brisbane.

At Roma the times of sunrise and sunset during May, June, July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given for Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

[All the particulars given on this page were computed by D. Eglinton, F.R.A.S., and should not be reproduced in local newspapers without acknowledgment.]

# Farm and Garden Notes for August.

This and the following two months are about the busiest periods of the year so far as work in the field is concerned; and the more activity now displayed in getting in the summer crops, the richer will be the reward at harvest time. Potatoes should be planted, taking care to select only good sound seed that has sprouted. This will ensure an even crop. Yams, arrowroot, ginger, sisal hemp, cotton, and sugar-cane may now be planted. Sow maize for an early crop. If the seed of prolific varieties is regularly saved, in the end it will not be surprising to find from four to six cobs on each stalk. This has been the experience in America, where the selecting of seeds has been reduced to fine art.

In choosing maize for seed, select the large, well-filled, flat grains. It has been shown that, by constantly selecting seed from prolific plants, as many as five and six cobs of maize can be produced on each stalk all over a field. A change of seed from another district is also beneficial. Sow pumpkins, either amongst the maize or separately, if you have the ground to spare. Swede turnips, clover, and lucerne may be sown, but they will have to contend with weeds, which will begin to vigorously assert themselves as the weather gets warmer; therefore, keep the hoe and cultivator constantly going in fine weather. Tobacco may be sown during this month. If vines are available, sweet potatoes may be planted towards the end of the month. In this case also it is advisable to avoid too frequent planting of cuttings from the old vines; and to obtain cuttings from other districts. If grasses have not yet been sown, there is still time to do so, if the work be taken in hand at once. Sugar-cane crushing will now be in full swing, and all frosted cane in the Southern district should be put through the rollers first. Plough out old canes, and get the land in order for replanting. Worn-out sugar lands in the Central and Northern districts, if not intended to be manured and replanted, will bear excellent crops of sisal hemp. Rice and coffee should already have been harvested in the North. The picking of Liberian coffee, however, only begins this month. Collect divi-divi pods. Orange-trees will be in blossom, and coffee-trees in bloom for the second time. As this is generally a dry month in the North, little can be done in the way of planting.

*Kitchen Garden.*—Nearly all spring and summer crops can now be planted. Here is a list of seeds and roots to be sown, which will keep the market gardeners busy for some time: Carrots, parsnip, turnip, beet, lettuce, endive, salsify, radish, rhubarb, asparagus, Jerusalem artichoke, French beans, runner beans of all kinds, peas, parsley, tomato, egg-plant, sea-kale, cucumber, melon, pumpkin, globe artichokes. Set out any cabbage plants and kohl-rabi that are ready. Towards the end of the month plant out tomatoes, melons, cucumbers, &c., which have been raised under cover. Support peas by sticks or wire-netting. Pinch

off the tops of broad beans as they come into flower to make the beans set. Plough or dig up old cauliflower and cabbage beds, and let them lie in the rough for a month before replanting, so that the soil may get the benefit of the sun and air. Top dressing, where vegetables have been planted out, with fine stable manure has a most beneficial effect on their growth, as it furnishes a mulch as well as supplies of plant food.

*Flower Garden.*—All the roses should have been pruned some time ago, but do not forget to look them over occasionally, and encourage them in the way they should go by rubbing off any shoots which tend to grow towards the centre. Where there is a fine young shoot growing in the right direction, cut off the old parent branch which it will replace. If this work is done gradually it will save a great deal of hacking and sawing when next pruning season arrives. Trim and repair the lawns. Plant out antirrhinums (snapdragon), pansies, hollyhocks, verbenas, petunias, &c. Sow zinnias, amaranthus, balsam, chrysanthemum, marigolds, cosmos, coxcombs, phloxes, sweet peas, lupins; and plant gladiolus, tuberoses, amaryllis, pancratium, ismene, crinums, belladonna, lily, and other bulbs. In the case of dahlias, however, it will be better to place them in some warm moist spot, where they will start gently and be ready to plant out in a month or two. It must be remembered that this is the driest of our months. During thirty-eight years the average number of rainy days in August was seven, and the mean average rainfall was 2·63 in., and for September 2·07 in., increasing gradually to a rainfall of 7·69 in. in February.

# Orchard Notes for August.

## THE SOUTHERN COAST DISTRICTS.

The remarks that have appeared in these notes during the last few months respecting the handling and marketing of citrus fruits apply equally to the present month. The bulk of the fruit, with the exception of the latest ripening varieties in the latest districts, is now fully ripe, and should be marketed as soon as possible, so that the orchards can be got into thorough order for the spring growth. All heavy pruning should be completed previous to the rise in the sap; and where winter spraying is required, and has not yet been carried out, no time should be lost in giving the trunks, main branches, and inside of the trees generally a thorough dressing with the lime and sulphur wash.

Where there are inferior sorts of seedling citrus trees growing, it is advisable to head same hard back, leaving only the main trunk and four or five well balanced main branches cut off at about 2 ft. from the trunk. When cut back give a good dressing with the lime and sulphur wash. Trees so treated may either be grafted with good varieties towards the end of the month or early in September; or, if wished,

they may be allowed to throw out a number of shoots, which should be thinned out to form a well balanced head, and when large enough should be budded with the desired variety.

Grafting of young stock in nursery, not only citrus but most kinds of deciduous fruits, can be done this month. It comes in useful in the case of stocks that have missed in budding, but for good clean grown stocks budding is to be preferred.

In the case of working our Seville orange stocks to sweet oranges, grafting is, however, preferable to budding, as the latter method of propagation is frequently a failure. The Seville stock should be cut off at or a little below the surface of the ground. If of small size, a single tongue graft will be sufficient, but if of large size, then the best method is the side graft—two or more grafts being placed in each stock, so as to be certain of one taking. In either case the grafts are tied firmly in place, and the soil should be brought round the graft as high as the top bud. If this is done, there will be few missed, and undesirable Seville stocks can be converted into sweet oranges.

In selecting wood for grafting, take that of the last season's growth that has good full buds and that is well matured; avoid extra strong, or any poor growths.

Seville oranges make good stocks for lemons. In case it is desirable to work them on to lemons, it is not necessary to graft below ground, as in the case of the sweet orange, but the stock can be treated in the same manner as that recommended in the case of inferior oranges—viz., to head hard back, and bud on the young shoots.

Where orchards have not already been so treated, they should now be ploughed so as to break up the crust that has been formed on the surface during the gathering of the crop, and to bury all weeds and trash. When ploughed, do not let the soil remain in a rough, lumpy condition, but get it into a fine tilth, so that it is in a good condition to retain moisture for the trees' use during spring. This is a very important matter, as spring is our most trying time, and the failure to conserve moisture then means a failure in the fruit crop to a greater or lesser extent.

Where necessary, quickly acting manures can be applied now. In the case of orchards, they should be distributed broadcast over the land, and be harrowed or cultivated in; but in the case of pines they should be placed on each side of the row, and be worked well into the soil.

The marketing of pines, especially smooths, will occupy growers' attention, and where it is proposed to extend the plantations the ground should be got ready, so as to have it in the best possible condition for planting, as the thorough preparation of the land prior to planting pines is money very well spent.

The pruning of all grape vines should be completed, and new plantings can be made towards the end of the month. Obtain well-matured, healthy cuttings, and plant them in well and deeply worked land, leaving the top bud level with the surface of the ground, instead of leaving 6 or 7 in. of the cutting out of the ground to dry out, as is

often done. You only want one strong shoot from your cutting, and from this one shoot you can make any shaped vine you want. Just as the buds of the vines begin to swell, but before they burst, all varieties that are subject to black spot should be dressed with the sulphuric acid solution—viz., three-quarters of a pint of commercial sulphuric acid to one gallon of water; or, if preferred, this mixture can be used instead—viz., dissolve 5 lb. of sulphate of iron (pure copperas) in one gallon of water, and when dissolved add to it half a pint of sulphuric acid.

## THE TROPICAL COAST DISTRICTS.

Bananas should be increasing in quality and quantity during the month, and though, as a rule, the fruit fly is not very bad at this time of the year, still it is advisable to take every care to keep it in check. No over-ripe fruit should be allowed to lie about in the gardens, and every care should be taken to keep the pest in check when there are only a few to deal with, as, if this is done, it will reduce the numbers of the pest materially later on in the season. The spring crop of oranges and mandarins will be now ready for marketing in the Cardwell, Tully, Cairns, and Port Douglas districts. For shipping South see that the fruit is thoroughly sweated, as unless the moisture is got rid of out of the skins the fruit will not carry. Should the skins be very full of moisture, then it will be advisable to lay the fruit on boards or slabs in the sun to dry; or, if this is not possible, then the skin of the fruit should be artificially dried by placing same in a hot chamber, as the moisture that is in the skin of our Northern-grown citrus fruits must be got rid of before they will carry properly.

Papaws and granadillas should be shipped South, and the markets tested. If carefully packed in cases holding only one layer of fruit, and sent by cold storage, these fruits should reach their destination in good order. Cucumber and tomato shipments will be in full swing from Bowen. Take care to send nothing but the best fruit, and don't pack the tomatoes in too big cases, as tomatoes always sell on their appearance and quality.

## THE SOUTHERN AND CENTRAL TABLELANDS.

All fruit-tree pruning should be finished during the month, and all trees should receive their winter spraying of the lime and sulphur wash.

All new planting should be completed, orchards should be ploughed and worked down fine, and everything got ready for spring.

In the warmer parts, grape pruning should be completed, and the vines should receive the winter dressing for black spot. In the Stanthorpe district grape pruning should be delayed as late as possible, so as to keep the vines back, as it is not early but late grapes that are wanted, and the later you can keep your vines back the better chance they have of escaping spring frosts.

Towards the end of the month inferior varieties of apples, pears, plums, &c., should be worked out with more desirable kinds; side, tongue, or cleft grafting being used. In the case of peaches, almonds, or nectarines, head back and work out by budding on the young growth.

# LIST OF AGRICULTURAL, HORTICULTURAL, AND PASTORAL SOCIETIES AND ASSOCIATIONS IN QUEENSLAND.

Societies and associations desirous of being registered and placed on the above list must make application to that effect, and forward to the Under Secretary for Agriculture and Stock the following particulars:—

Number of members who have paid their subscriptions for 1912.

Number of meetings held by the Society during 1912.

Date of the last meeting.

Name of the Secretary for 1913.

It is equally necessary that prompt notice be given to the Editor of changes in the Secretaryship of any Society or Association, a matter which is much neglected. Furthermore, information concerning dates on which shows are to be held must be forwarded to the Editor at least six weeks before the Show date. If these suggestions are not complied with, the Society whose Secretary neglects to supply the required information will be liable to be struck off the list of Societies published monthly in the Journal.

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914 | 1915. |
| Allora ... | Central Downs Agricultural and Horticultural Association | J. C. Marshall ... | 17 and 18 Feb. | 17 and 18 Feb. |
| Aloomba, *viâ* Cairns | Aloomba Farmers' Association ... | Hugh A. Niven ... | | |
| Amberley ... | Amberley Farmers' Progress Association | J. T. Goldsborough | | |
| Atherton ... | Atherton Agricultural, Pastoral, and Industrial Association | H. McKnight ... | | |
| Atherton ... | Atherton Table Land Agricultural Society | H. McKnight ... | ... | 22 and 23 Sept. |
| Ayr ... .. | Lower Burdekin Farmers' Association | R. W. Edwards ... | | |
| Ayr ... ... | Lower Burdekin Pastoral, Agricultural, and Industrial Association | C. G. M. Boyce ... | 11 and 12 June | |
| Bajool ... | Bajool and Ulam Farmers' Progress Association | A. T. Mitchell ... | | |
| Ban Ban, *viâ* Byrnestown | Dundar Branch of the Queensland Farmers' Union | Geo. Gwynne ... | | |
| Barcaldine ... | Barcaldine Pastoral Agricultural and Horticultural Association | W. J. P. Chambers | | |
| Beaudesert | Logan and Albert Agricultural and Pastoral Society | M. Selwyn Smith | 12 and 13 May | 11 and 12 May |
| Beenleigh ... | Agricultural and Pastoral Society of Southern Queensland | Capt. C. G. Gehrmann | 3 and 4 Sept. | 23 and 24 Sept. |
| Beenleigh ... | Logan Farmers' and Industrial Association | Wm. G. Winnett ... | | |
| Beerwah ... | Coochin Creek District Agricultural and Progress Association | E. F. Jones ... | | |
| Belli ... | Belli Creek Farmers' Progress Association | W. E. Neumann .. | | |
| Berwen ... | Haughton River Farmers' Association | James Griffith ... | | |
| Biggenden ... | Biggenden Agricultural and Pastoral Society | C. J. Stephensen .. | 9 and 10 July | 22 and 23 June |
| Bin Bin, *viâ* Gooroolba | Bin Bin Farmers and Settlers' Association | Milo Burke ... | | |
| Blackall ... | Barcoo Pastoral Society ... ... | C. M. Pegler ... | | |
| Blenheim ... | Blenheim and District and Farmers' Progress Association | W. A. Zerner ... | | |
| Blythedale ... | Blythedale Agricultural Progress Association | J. L. Quinn ... | | |
| Boonah ... | Fassifern and Dugandan Agricultural and Pastoral Association | J. McKenzie ... | 20 and 21 May | 19, 20, and 21 May |
| Boowoogum... | Brooyar Farmers' Progress Association | Jas. Cahill ... | | |
| Bowen ... | Bowen Farmers' Association... ... | H. Reye ... ... | | |
| Bowen ... | Bowen Pastoral, Agricultural and Mining Association | F. Sellars ... ... | 22, 23, and 24 July | |

## AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914. | 1915. |
| Brisbane ... | The Queensland Dairy Herd Book Society | Alfred Gorrie ... | | |
| Brisbane .. | National Agricultural and Industrial Association of Queensland | J. Bain ... ... | 10 to 15 Aug. | 9 to 14 Aug. |
| Brisbane ... | Queensland Chamber of Agricultural Societies | J. Bain ... ... | | |
| Brisbane | Horticultural Society of Queensland | F. W. Woodroffe ... | | |
| Bucca, *vid* Bundaberg | United Farmers' Association ... | J. H. Hendy ... | | |
| Buderim Mountain | Buderim Branch of the Queensland Farmers' Union | Capt. G. Burrows .. | | |
| Bundaberg ... | Bundaberg Agricultural, Pastoral, and Industrial Society | Redmond Bros. ... | 3 and 4 Sept. | 9 and 10 Sept. |
| Bundaberg ... | Canegrowers' Union of Australia (Woongarra Branch) | O. H. Klotz ... | | |
| Bundaberg ... | Woongarra Canegrowers' Association (A.S.P.A. Branch) | G. O. Strathdee ... | | |
| Bunerba, Deeford (*vid* Westwood) | Bunerba Farmers' Progress Association | H. J. Barnes ... | | |
| *Burrum ... | Burrum District Farmers' and Fruitgrowers' Association | S. E. Tooth ... | | |
| Byrnestown... | Byrnestown Farmers and Dairymen's Progress Association | Geo. H. Bomford ... | | |
| Caboolture ... | Caboolture Pastoral, Agricultural, and Industrial Society | C. V. Hemming ... | 1 May | 29 and 30 April |
| Cairns .. | Cairns Agricultural, Pastoral, and Mining Association | H. McMahon ... | | |
| Cairns ... | Cairns Horticultural Society .. | R. Tweedie ... | | |
| Cedar Pocket, Gympie | Cedar Pocket Farmers' Association... | W. A. Fraser ... | | |
| Charleville .. | Central Warrego Pastoral and Agricultural Association | T. C. Fallis ... | 4 and 5 May | |
| Charters Towers | Charters Towers Pastoral, Agricultural, and Mining Association | A. H. Pritchard ... | 1 and 2 July | 6 to 8 July |
| Charters Towers | The Towers Horticultural Society ... | Jas. H. Chappel ... | 19 and 20 August | 25 and 26 August |
| Chatsworth ... | Chatsworth Combined Farmers' Association | F. W. Johns ... | | |
| Chatsworth ... | Chatsworth Farmers' Progress Association | W. Allen ... ... | | |
| Childers ... | Childers Pastoral, Agricultural, and Industrial Society | J. R. Wrench ... | 18 and 19 June | 10 and 11 June |
| Childers ... | Doolbi Canegrowers' Association ... | R. S. Rankin ... | | |
| Chinchilla ... | Canaga Farmers' Progress Association | G. H. Rochester | | |
| Chinchilla .. | Pelican Farmers and Settlers' Association | H. K. Nevell ... | | |
| Chinchilla ... | Chinchilla Agricultural and Pastoral Association | B. Mackie ... ... | 14 and 15 April | 6 and 7 April |
| Clermont ... | Peak Downs Pastoral, Agricultural, and Horticultural Society | A. S. Narracott ... | 23 and 24 June | |
| Clifton ... | Darling Downs Pastoral, Agricultural and Industrial Association | S. C. Mott... ... | 30 Sept. and 1 Oct. | 22 and 23 Sept. |
| Coochin ... | Coochin Farmers' Progress Association | W. Watson ... | | |
| Cooktown ... | Cooktown District Pastoral, Agricultural, Mining, and Industrial Association | E. A. S. Olive ... | 1 and 2 July | |
| Cooroy ... | Cooroy West Farmers' Progress Association | O. M. Proll ... | | |
| Cooroy ... | Mount Cooroy Progress and Farmers' Association | L. H. Baldwin ... | | |
| Coulsen ... | Coulsen Farmers' Progress Association | Gustav A. Lewald | | |
| Coulstoun, *vid* Biggenden | Coulston Lakes Branch of the Queensland Farmers' Union | P. E. Britnell ... | | |
| Crow's Nest | Crow's Nest Agricultural, Horticultural, and Industrial Society | James Gleeson ... | 28 and 29 April | 6 and 7 April |
| Dalby ... | Northern Downs Pastoral and Agricultural Association | W. R. Hunter ... | 26 and 27 May | 21 and 22 April |

* Monthly meetings held alternately at Burrum and Howard.

## AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914. | 1915. |
| Dallarnil ... | Dallarnil Farmers and Dairymen's Association | H. J. Piper ... | | |
| Didcot ... | Didcot Farmers and Settlers' Association | Fred. Jones ... | | |
| Deeford, (Dawson Valley) | Dundee Farmers and Settlers' Progress Association | C. G. Young ... | | |
| Degilbo ... | Emu Creek Farmers and Dairymen's Progress Association | J. E. Peterson ... | | |
| Dirran, *viâ* Malanda | Dirran Settlers' Progress Association | Percy G. R. Dutton | | |
| Emerald ... | Emerald Pastoral and Agricultural Society | J. Esmond ... ... | ... | 26 and 27 May |
| Esk ... ... | Esk and Toogoolawah Pastoral, Agricultural, and Industrial Association | Thos. C. Pryde ... | 5 and 6 May (at Toogoolawah) | 8 and 9 June |
| Eukey, *viâ* Ballandean | Eukey Farmers and Fruit-growers' Association | H. H. Stanton ... | | |
| Evelyn ... | Millstream Farmers and Settlers' Association | H. R. Gardiner ... | | |
| Fairford ... | Fairford Agricultural and Pastoral Association | H. E. Hollins ... | | |
| Fordsdale, *viâ* Grantham | Fordsdale Farmers' Association ... | W. M. Ridley ... | | |
| Forest Hill ... | Forest Hill Agricultural and Progress Association | J. Stoddart ... | | |
| Gayndah ... | Philpott Creek Farmers' Progress Society | E. P. Earle ... | | |
| Gayndah ... | Pastoral, Industrial, Agricultural, and Horticultural Association | M. C. Stephensen... | 9 and 10 June | 22 and 23 June |
| Gayndah ... | Gleneden Branch of the Queensland Farmers' Union | W. S. Morris ... | | |
| Gayndah ... | Gurgeena Farmers' Progress Association | W. G. Leaver ... | | |
| Gayndah ... | Binjour Farmers' Progressive Association | F. G. Hunter ... | | |
| Gin Gin ... | Currajong and Gin Gin Agricultural, Pastoral, and Industrial Society | C. M. Morris ... Ploughing Match | 27 and 28 May | 17 and 18 June |
| Gladstone ... | Port Curtis Agricultural, Pastoral, and Mining Association | J. T. W. Brown ... | ... | 18 and 19 May |
| Glen Aplin ... | Ballandean Fruitgrowers' Association | W. H. C. Laird .. | | |
| Gooburrum ... | Gooburrum Farmers' and Cane-growers' Association | W. J. Lutin .. | | |
| Goomboorian road *viâ* Gympie) | Ross and Mullin's Creek Farmers' Progress Association | R. E. Kitchen ... | | |
| Goombungee | Goombungee Agricultural, Horticultural and Pastoral Society | J. J. Morgan ... | ... | 24 March |
| Goondiwindi | Comoron-Moorobie Farmers' Progress Association | J. Johnston ... | | |
| Goondiwindi | MacIntyre Pastoral and Agricultural Society | E. T. Drake .. | 29 and 30 April | |
| Gooroolba .. | Gooroolba Farmers and Settlers' Progress Association | H. A. Harrison ... | | |
| Grantham ... | Ma Ma Creek Farmers' Progress Association | A. McKenzie ... | | |
| Gympie ... | Agricultural, Mining, and Pastoral Society | F. W. Shepherd ... | 9 and 10 Sept. | 1 and 2 Sept. |
| Gympie (Goomboorian road) | The Veteran and Scrubby Creek Farmers' Progress Association | T. T. Ramskill ... | | |
| Hambledon (Cairns) | Hambledon Cane Farmers' Association | F. C. P. Curlewis | | |
| Hawthorn (Daymar Siding) | Weengallon Farmers and Settlers' Progress Association | Laurence A. Seeger | | |
| Helidon ... | Flagstone Creek Branch of the Queensland Farmers' Union | Fred Tuffrey .. | | |
| Herberton ... | Herberton Mining, Pastoral, and Agricultural Association | Richard Barton ... | 13 and 14 April | 5 and 6 April |

## AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914. | 1915. |
| Hughenden ... | North Western Queensland Pastoral and Agricultural Association | H. P. Blackall ... | 11 and 12 May | |
| Ingham ... | Herbert River Pastoral and Agricultural Association | R. L. Jones .. | 4 and 5 Sept. | 17 and 18 Sept. |
| Inglewood ... | Inglewood Agricultural, Pastoral, and Horticultural Society | J. F. Cheshire ... | 19 and 2 March | 24 and 25 March |
| Inkerman (Lower Burdekin) | Inkerman Farmers and Graziers' Association | L. M. Osborne ... | | |
| Innisfail ... | Johnstone River Canegrowers and Manufacturers' Association | Ralph Reid ... | | |
| Innisfail ... | Johnstone River Agricultural Society | T. Nesbet ... ... | | |
| Ipswich ... | The Queensland Pastoral and Agricultural Society | G. W. Allen ... | 27 and 28 May | 26 and 27 May |
| Ipswich ... | Ipswich Horticultural Society ... | Hugh Parkinson ... | | |
| Jackson (Western Line) | Parish Woleebee Settlers' Association | S. C. Griffin ... | | |
| Jardine ... | Jardine Farmers' and Fruitgrowers' Association | R. Lemain ... ... | | |
| Juandah ... | Juandah Dairy and Progress Association | R. Bowie ... ... | | |
| Kamma (Cairns) | The Cairns Canegrowers' Association | C. V. Hives ... | | |
| Kenmore ... | Brookfield, Pullen Vale, and Moggill Farmers' Association | F. B. Howard .... | | |
| Kilcoy ... | Kilcoy Pastoral, Agricultural, and Industrial Society | W. E. Reason ... | 14 and 15 May | 6 and 7 May |
| Kilkivan ... | Kilkivan Pastoral, Agricultural, and Industrial Association | F. E. Hopkins ... | 2 July | 9 and 10 June |
| Killarney ... | Killarney Agricultural Society ... | L. W. Wilkinson ... | ... | 24 and 25 Feb. |
| Kingaroy ... | Agricultural, Pastoral, and Industrial Society | R. A. Pearce ... | 20 and 21 May | 24 and 25 March |
| Kin Kin, *viâ* Cooran | Kin Kin and District Farmers' Progressive Association | A. C. Stewart ... | | |
| Kooroongarra *viâ* Inglewood | Kooroongarra Farmers' Progress Association | J. French ... ... | | |
| Laidley ... | Farmers' Progress Association ... | G. A. Moulday ... | | |
| Laidley ... | Lockyer Agricultural and Industrial Society | F. Roberts ... ... | ... | 21 and 22 July |
| Lake Clarendon (*viâ* Gatton) | Lake Clarendon Branch of the Queensland Farmers' Union | W. J. Walton ... | | |
| Lockrose ... | Lockrose and District Farmers' Progress Association | R. W. L. Raymont | | |
| Longreach ... | Longreach Pastoral and Agricultural Society | A. Petersen ... | 4 and 5 May | |
| Lowood ... | Lowood and Tarampa Pastoral and Agricultural Association | W. E. Michel ... | 13 and 14 May | 11 and 12 May |
| Mackay ... | Pioneer River Farmers and Graziers' Association | T. J. Leonard ... | 23 and 24 June | |
| Mackay .. | The Pioneer River Farmers and Graziers' Show Association | T. J. Leonard ... | ... | 22 and 23 June |
| Macnade, *viâ* Lucinda | Macnade Farmers' Association | E. S. Waller ... | | |
| Malanda ... | Millaa Millaa Settlers' Progress Association | S. S. Buckley ... | | |
| Mapleton ... | Mapleton Fruitgrowers and Farmers' Progress Association | J. G. Smith ... | | |
| Marburg ... | Marburg and District Agricultural and Industrial Association | A. H. Bielefeld ... | 2 and 3 June | 2 and 3 June |
| Mareeba ... | Mareeba District Mining, Pastoral, Agricultural, and Industrial Association | W. A. Ferguson ... | 25 and 26 May | |
| Maryborough | Wide Bay and Burnett Pastoral and Agricultural Society | H. A. Jones ... | 2, 3, and 4 June | 1, 2, and 3 June |

## AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914. | 1915. |
| Miles ... | Miles District Agricultural and Pastoral Society | T. P. Goonan ... | ... | 21 April |
| Minehan's Siding, *viâ* Townsville | Haughton River Farmers' Association | W. E. G. Smith ... | | |
| Mitchell ... | Maranoa Pastoral, Agricultural, and Industrial Association | Neil Hammond ... | 12 and 13 May | 11 and 12 May |
| Mondure, *viâ* Wondai | Mondure Farmers and Dairymen's Association | G. E. Compagnoni | | |
| Montville ... | Montville Fruitgrowers and Farmers' Progress Association | F. W. Thompson ... | | |
| Mooloolah ... | Mooloolah and Glenview Farmers' Progress Association | William Ellison ... | | |
| Mount Larcom (Gladstone) | Wilmott Farmers' Progress Association | J. J. Kelly... ... | | |
| Mount Larcom | Mount Larcom Farmers' and Canegrowers' Association | R. R. Nöthling ... | | |
| Mt. Marshall, *viâ* Allora | Mount Marshall Farmers' Progress Association | J. Rooney ... ... | | |
| Mullet Creek | Mullet Creek Farmers' Association... | G. Lee ... ... | | |
| Mundowran | Mundowran Pocket Farmers' Association | E. Canty ... ... | | |
| Mundubbera | Mundubbera Farmers and Settlers' Progress Association | W. G. Parker ... | | |
| Murgon ... | Murgon Branch of the Queensland Farmers' Union | W. D. Davidson ... | | |
| Murray's Creek | Murray and Baffle Creek Progress and Farmers' Association | T. J. Gee ... | | |
| Nambour ... | Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society | A. H. Bushnell ... | 8 and 9 July | 21 and 22 July |
| Nambour ... | Bli Bli Farmers and Fruitgrowers' Progress Association | F. Pashen ... ... | | |
| Nanango ... | Nanango Agricultural, Pastoral, and Mining Society | W. Selby ... ... | 27 and 28 May | 23 and 24 Sept. |
| Nerang ... | Southern Queensland and Border Agriculturaland Pastoral Association | Edgar J. Foote ... | | |
| North Arm, N. C. Railway | North Arm Farmers' Progress Association | J. F. Fountain ... | | |
| North Pine ... | The Pine Rivers Agricultural, Horticultural, and Industrial Association | G. W. Armstrong... | 25 and 26 June | 25 and 26 June |
| Oakey ... | Oakey Agricultural and Pastoral Society | Alan B. Stanley ... | 9 Sept. | |
| Oakey Creek, *viâ* Eumundi | Kenilworth Farmers' Association ... | Harry Pickering ... | | |
| Okeden, *viâ* Wondai | Proston, Okeden, and Wigtoun Settlers' Association | R. McNamara ... | | |
| Oman-ama ... | Redbank Farmers' Progress Association | W. K. Ison ... | | |
| Palmwoods ... | Queensland Farmers' Union (Palmwoods Branch) | W. Browne ... | | |
| Palmwoods ... | Palmwoods Progress and Fruitgrowers' Association | Hugh McVair McKay | | |
| Pickanjennie | Pickanjennie Farmers' Progress Association | J. Proud ... ... | | |
| Pittsworth ... | Pittsworth Pastoral, Agricultural, and Horticultural Association | W. O. Hare ... | 28 Jan. | 27 Jan. |
| Pomona ... | Noosa Agricultural, Horticultural, and Industrial Society | W. B. Smith ... | 4 and 5 Nov. | 17 and 18 Nov. |
| Proserpine ... | Proserpine Farmers and Canegrowers' Association | W. B. Caswell ... | 17 July | |
| Ravenshoe ... | Ravenshoe Farmers and Graziers' Progress Association | W. R. Soilleux ... | | |
| Roche Creek, *viâ* Miles | Roche Creek Farmers' Progress Association | G. F. Smith ... | | |
| Rockhampton | Alton Downs Farmers' Association... | G. T. Crook ... | | |

## AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914. | 1915. |
| Rockhampton | Rockhampton Agricultural Society... | H. Hill ... ... | 18, 19, and 20 June | 27, 28, and 29 May |
| Rockhampton | Jardine Farmers and Fruitgrowers' Progress Association | R. Lamain ... | | |
| Rockhampton | Fitzroy Farmers' Progress Association | T. Ritchie ... ... | | |
| Roma .. | Western Pastoral and Agricultural Association of Queensland | H. M. Campbell ... | 19 and 20 May | 20 and 21 July |
| Roma ... | Euthulla and Upper Bungil Farmers and Settlers' Association | John J. Maun ... | | |
| Rosewood ... | Rosewood Agricultural and Horticultural Association | A. J. Loveday ... | 29 and 30 July | 28 and 29 July |
| Sexton ... | Sexton Farmers and Settlers' Progress Association | W. K. Harvey ... | | |
| Speedwell, *viâ* Stalworth | Speedwell Farmers' Progress Association | Aubray U. Potter | | |
| Springsure ... | Springsure Pastoral and Agricultural Society | W. Fisher ... ... | 13 and 14 May | 12 and 13 May |
| St. George ... | Balonne Pastoral and Agricultural Association | Mark Roberts ... | | |
| Stanthorpe ... | Stanthorpe Agricultural Society ... | A. E. Bateman ... | ... | 3, 4, and 5 Feb. |
| Tabragalba ... | Tabragalba and Canungra Farmers' Progress Association | A R. Ludwig ... | | |
| Takura, *viâ* Maryboro' | Takura Farmers' Union ... ... | S. E. Tooth ... | | |
| Teutoberg ... | Teutoberg Farmers' Progress Association | E. H. Ochmichen ... | | |
| The Caves, *viâ* Rockhampton | Mount Etna Farmers and Selectors' Progress Association | Geo. Smith ... | | |
| The Gums, *viâ* Tara | The Gums and Horse Creek Pastoral and Agricultural Association | Arthur Henry ... | | |
| Tolga ... | Tolga Forest Farmers' Union ... | H. Northey ... | | |
| Toowoomba... | Royal Agricultural Society of Queensland | G. Noble ... ... | 21 to 23 April | 13, 14, and 15 April |
| Toowoomba... | Toowoomba White Growers' Association | A. C. Salmon ... | | |
| Townsville ... | Townsville Pastoral, Agricultural, and Industrial Association | J. N. Parkes ... | 14 and 15 July | 29 and 30 June |
| Wallumbilla | Wallumbilla Farmers' Association ... | H. A. Watson ... | | |
| Warwick .. | Eastern Downs Horticultural and Agricultural Association | F. H. Selke ... | 10 to 12 Feb. | 9, 10, 11, & 12 Feb. |
| Wellington Point | Wellington Point Agricultural, Horticultural, and Industrial Association | E. Ziegenfusz ... | 4 July | |
| Wondai ... | Wondai Agricultural, Pastoral, and Industrial Society | H. J. Compagnoni | 13 and 14 May | 26 and 27 May |
| Wondalli, *viâ* Goondiwindi | Wondalli-Yelarbon Farmers' Progress Association | L. C. G. Cameron | | |
| Woodend ... | Warren-Woodend Farmers' Club ... | W. Lehfeld ... | | |
| Woodford ... | Woodford Agricultural, Pastoral, and Industrial Society | G. H. Osmond ... | 28 and 29 May | 22 and 23 April |
| Woombye ... | North Coast Agricultural and Horticultural Society | E. E. McNall ... | 10 and 11 June | 23 and 24 June |
| Woombye ... | Woombye Fruitgrowers' and Progress Association | J. Howe ... ... | | |
| Woongarra ... | Woongarra Canegrowers and Farmers' Union | H. A. Cattermull... | | |
| Woowoonga Scrub | Woowoonga Farmers and Canegrowers' Association | Thos. Wilkins ... | | |
| Yandina ... | Maroochy River Farmers' Union and Progress Association | D. G. Martin ... | | |
| Yandina Creek *viâ* North Arm, N.C. Line | Yandina Creek Farmers and Settlers' Progress Association | J. D. Benfer ... | | |
| Yingerbay ... | Yingerbay Dairymen and Farmers' Association | R. Frederick ... | | |
| Zillmere ... | Zillmere Agricultural, Horticultural, and Industrial Society | Arthur B. Marquis | 3 Oct. | 18 Sept. |

# Departmental Announcements.

The Editor will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

Secretaries of Associations are requested to be good enough to forward to the Editor, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published.

It is equally necessary that prompt notice be given to the Editor of changes in the Secretaryship of any Society or Association, a matter which is much neglected. Furthermore, information concerning dates on which shows are to be held must be forwarded to the Editor at least six weeks before the Show date. If these suggestions are not complied with, the Society whose Secretary neglects to supply the required information will be liable to be struck off the list of Societies published monthly in the Journal.

To enable recipients of the *Queensland Agricultural Journal* to have the half-yearly volume bound, Covers in Boards and Cloth will be supplied from this Office on application to the Under Secretary for Agriculture. Applications must be accompanied by a remittance to cover cost. Covers will be supplied at ONE SHILLING and ONE SHILLING AND NINEPENCE each.

In order to avoid disappointment, correspondents who wish for replies to questions in the Journal are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

Persons desiring to communicate with the Queensland Agricultural College and State Farms are requested to address their correspondence to the Principal of the College, Gatton, and to the Managers of the State Farms. The State Farms are: Hermitage (Warwick), Gindie (*viâ* Springsure), Warren (Stanwell), Bungeworgorai (Roma), Kairi (Tolga), Kamerunga State Nursery (Cairns).

We would ask our Subscribers to note that, when their Subscription has run out, a RED CROSS is placed against the Order Form. It often happens that this intimation is disregarded, with the result that the JOURNAL is NOT POSTED to the Subscriber. The Department cannot guarantee to supply back numbers in such cases.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the Institution. Supplies of hot water and milk can be obtained at the College, if desired.

The Department has now prepared a booklet on "Flower Gardening for Amateurs," which may be obtained on application to the Under Secretary for Agriculture and Stock. Price, TWO SHILLINGS.

PAMPHLETS on different subjects relating to Agriculture, Horticulture, and Stock are issued by the Department, and may be obtained gratis, on application to the Under Secretary.

## NOTICE OF SHOW DATES.

We wish to draw the attention of Secretaries of Agricultural and Pastoral Societies and Associations to the importance of promptly notifying the Editor of any change in the dates on which shows are to be held.

NOTICE.

All communications in connection with the Journal, inquiries, &c., should be addressed to " The Editor " only. Letters addressed personally are liable to delay in reply.

No replies can be given to Anonymous letters. The writers are requested to sign their communications, not necessarily for publication.

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# QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

## FOR SALE.

GRASS ROOTS.—Paspalum and Rhodes.

POULTRY DEPARTMENT.

The College has for sale Poultry of the following breeds:—Brown Leghorn, White Leghorn, Silver-Grey Dorking, Indian Game, Plymouth Rock, Black Orpington, Buff Orpington, Silver-Laced Wyandotte, and White Wyandotte.

PRICES.

Cockerels, 10s., 15s., and 21s., f.o.b., Gatton.

Pairs—Cockerel and Pullet—30s. and 42s., f.o.b., Gatton.

Trios—Cockerel and Two Pullets—42s. and 63s., f.o.b., Gatton.

Prices vary, as above stated, according to quality. Additional charges of 2s. for a single bird and 1s. for each additional bird will be incurred by purchasers who fail to return crates promptly.

Eggs of the above breeds are offered for sale during the season, 1st July to 30th November. Price, 10s. per setting of twelve, F.O.B., Gatton. Nine eggs in each setting are guaranteed fertile. Should less than nine prove to be fertile, the infertiles will be replaced, if returned, carriage paid, and unbroken.

(N.B.—An infertile egg is uniformly translucent when held up to a strong light. Settings should be allowed to settle 24 hours before being placed under the hen.)

In cases where eggs cannot be sent otherwise than by parcel post, sixteen eggs will be sent to a setting, and no responsibility will be taken in connection with the replacing of any eggs which fail to hatch.

Applications for birds or eggs should be accompanied by remittance and addressed to the Principal, Agricultural College, Gatton.

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The following Stud Animals are available for Service at the College Farm:—

AYRSHIRE—

Netherton King George, Imported. Sire: Netherton King Arthur. Dam: Midland Young Greenfield.

SHORTHORN BULL—

Bloomer of Darbalara. Sire: Emblem of Darbalara, 100 M.S.H.B. Dam: Lucy II., 1038 M.S.H.B.

Sows may be served also by imported Berkshire, British Large Black, and Yorkshire Pigs, at a charge of 5s. for each service.

Consequent on the numerous orders on hand for Pigs for forward delivery, it will be several months before there is any likelihood of fresh orders being filled.

A charge of TWO SHILLINGS and SIXPENCE will be made if Sows are left at the College for three weeks, for second service if required, for the keep of each animal.

Orders will be accepted after the 1st January, 1915, for BERKSHIRE and YORKSHIRE BOARS. It will, however, be some months before orders for Sows of either breed can be booked.

J. BROWN, Principal.

## FOR SALE.

GRASS ROOTS.—Paspalum and Rhodes Grass at 2s. 6d. per sack. F.O.B., Gatton.

Applicants will be supplied on receipt of remittance to the amount of the Order.

Japanese Millet Seed. Price, 3d. per lb., or 25s. per cwt. F.O.B., Gatton.

There are no other Farm Seeds or Produce at present for Sale at the College.

## QUEENSLAND AGRICULTURAL COLLEGE.

The College, which is situated within 4 miles of Gatton and 1 mile from the College Railway Siding, comprises 1,692 acres, and the buildings can accommodate 60 Students.

### TERMS.

TWENTY-SEVEN POUNDS per annum, paid half-yearly in advance. Students are also charged One Pound per annum each for medical attendance, the sports fund, and for guarantee fee.

The course of instruction includes PRACTICAL AGRICULTURE in all its branches, DAIRYING, GARDENING, STOCK-BREEDING, and MECHANICAL ARTS. Classes are also held daily for THEORETICAL INSTRUCTION in these branches, as well as in SURVEYING, CHEMISTRY, &c.

The College Calendar, giving full particulars, may be obtained on application to the Principal at the College, or to the Under Secretary for Agriculture and Stock, Brisbane.

### BURSARIES.

Four bursaries are given annually. An examination for these is held in December of each year. Bursaries will be awarded upon the following conditions:—Candidates (males) to be from fifteen to eighteen years of age, of sound constitution, and in good health; they must have resided in the State for the two years immediately preceding the time of their examination for such bursary; or their parents must have resided in the State three years immediately preceding such examination. The bursar is entitled—subject to good behaviour and the pleasure of Parliament—to free board and instruction as a resident student for a period of three years. He is required to take up his residence at the College within one month of the publication of the results of the examination; otherwise he forfeits his right to a bursary.

The AGE of CANDIDATES for Admission to the College as Students is Fourteen Years.

Full particulars and conditions on application to

THE UNDER SECRETARY,
Department of Agriculture and Stock, Brisbane.

# STATE FARM, KAIRI, N.Q.

## FOR SALE.

ORDERS accepted for JERSEY and AYRSHIRE BULLS as at six months old; BERKSHIRE PIGS as at six weeks old; and BUFF ORPINGTON COCKERELS. Conditions: Stock to be paid for and delivery taken at the Farm.

Those desirous of obtaining Stock from this Farm should apply to the Manager, from whom all particulars can be obtained.

D. MACPHERSON,
Manager.

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# STATE FARM, WARREN.

## STOCK FOR SALE.

Young AYRSHIRE BULLS. Prices and particulars on application.

Young BERKSHIRE BOARS AND SOWS. Prices: Boars, £2 2s.; Sows, £1 1s. F.O.B., Warren. Crates returned.

Roots of the following Grasses for sale at 2s. 6d. per sack. F.O.B., Warren:—

RHODES. PASPALUM. GIANT COUCH.

THOS. JONES, Manager.

## FOR SERVICE AT WARREN STATE FARM.

The Imported CLYDESDALE STALLION, "SIR GEORGE."
Fee: £2 2s. per mare; and 1s. per week agistment.

AYRSHIRE DAIRY BULL, "NAOMI'S ARTHUR." Fee: 5s. per cow; and 6d. per week agistment.

TWO IMPORTED BERKSHIRE BOARS—"Peterkin W." and "Flockmaster." Fee: 5s. per sow; and 1s. per week agistment.

THOS. JONES, Manager.

---

# ROMA STATE FARM, BUNGEWORGORAI.

## FOR SERVICE.

Imported Ayrshire Bull, ARNESS SUPREME; FEE, FIVE SHILLINGS per cow. Agistment, 6d. per week.

Pure Ayrshire Bull Calves from SIX GUINEAS each.

### SEEDS AVAILABLE—

SORGHUM—Favorita. A limited quantity at 6d. per lb.
TEFF GRASS SEED, 2s. per lb.
RED KAFIR, 3d. per lb. A limited quantity.
SETARIA, 6d. per lb.
Plants of Rhodes Grass, ONE SHILLING per Sack.

### CUTTINGS—

Orders for Vine Cuttings will be received until the end of June.
Price: Table Varieties, 4s. per 100, or 3 's. per 1,000.
Wine Varieties, 3s. per 100, or £1 per 1,000.

## STATE NURSERY, KAMERUNGA, CAIRNS.

Various Tropical Plants can be obtained at the Nursery on application to the Manager, who will supply full particulars as to Plants available, conditions, &c.

## THE FAMOUS GUADA BEAN.

Length to 7 feet. Five Pence per Seed. Write for MY NEW SEED LIST.

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Near Boggabri.


## COTTON.

—:o:—

The Department of Agriculture and Stock is prepared to receive RAW COTTON, gin, and market it on owner's account. An advance of 1½d. a lb. will be made upon the raw cotton received, and any surplus after sale after deducting charges will be paid to the grower *pro rata*. Consignments are to be forwarded addressed to the Under Secretary, Department of Agriculture, Brisbane, who should be advised of despatch.

## TO FARMERS.

—:o:—

From Farmers wishing to effect Sale, Purchase, or Exchange of Live Stock, Produce, or Farm Implements, ADVERTISEMENTS will be accepted at a Minimum Charge, per issue, of THREE SHILLINGS for 25 WORDS. Extra Words will be charged for at the rate of ONE PENNY PER WORD. Remittance must be forwarded with the Advertisement.


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| 4 ,, | 65/- ,, ,, | 65 ,, |
| 6 ,, | 75/- ,, ,, | 79 ,, |

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# The Weeds and Poisonous Plants of Queensland.

By F. MANSON BAILEY, C.M.G., F.L.S.

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With Plates illustrating some Rare Species.

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QUEENSLAND AGRICULTURAL JOURNAL

VOL. IV. AUGUST, 1915. PART 2.

# Agriculture.

## NOTES ON THE 1914 WHEAT SEASON AND PROSPECTS FOR 1915.

The position in Queensland during 1914-15, as far as the bread cereal is concerned, presented some unique features. First and foremost, the 1914 harvest estimates were somewhat conflicting owing to the appearance of rust in the late crops at the southern end of the Downs, and to the serious check the wheat crops experienced in the spring months along a stretch of the Western line, which extends from Gowrie Junction to the Warra district. However, the first fruits of the harvest served to indicate that in localities favoured by decent weather conditions individual yields of grain left nothing to be desired, and the quality proved to be exceptionally good.

Then the all-important question of aggregate yields and prospective supplies cropped up.

Reckoning on 5½ bushels of grain per head of population, Queensland would require approximately 4,000,000 bushels of wheat to meet

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ERNEST WICKHAM, *Res. Sec.*

her food supplies. How far was the new crop going to carry on? Stand-over stocks of previous season's grain were very limited and the position in the South was critical. It was only too patent to the most sanguine optimist that only about 1¾ million bushels of wheat would be secured in the State. Where was the balance to come from? New South Wales legislators took an extreme view of the situation in their State and commandeered stocks at 5s. per bushel. Buying in Queensland commenced at 4s. 6d. per bushel, and at no period in the previous history of the State have such extraordinary prices obtained.

Farmers were faced with a dilemma! Obligations had to be met. Drought and high prices for all classes of food on the one hand, and all the uncertainty due to Southern legislation on the other. Some political advisers held meetings and counselled farmers to hold stocks on a rising market. Millers were buying to the utmost limit. Southern buyers, attracted by prime quality and a certainty of profit, purchased over 100,000 bushels, thus seriously depleting stocks. From 4s. 6d., the market quickly worked up to 7s. 6d., and even touched 7s. 9d. The board appointed to control food prices experienced increasing difficulties in making adjustments to meet the situation. In the early part of the year steps were taken by the Government to secure shipments of wheat to ensure a supply of foodstuffs.

Following on immediately after the elections the newly appointed Premier and Cabinet were faced with extraordinary economic conditions and a Wheat Commission was appointed to settle once and for all the complex problems that had arisen.

It is here that cognizance should be taken of "the wheat extension scheme" brought into being by the late Government. Requirements in the way of breadstuffs to meet our own needs of the future had to be faced. A scheme was initiated to encourage farmers to put larger areas under crop and several officers of the Agricultural Department were deputed to canvass different districts to explain its objects, and to arrange not only direct monetary advances to meet individual exigencies, but also to purchase and to make recommendations as to the supply of seed wheat for the 1915 planting season. Here the Government itself came into competition with other buyers, as they were committed to a scheme obligatory upon themselves, which entailed purchasing only the primest wheat obtainable. A wide interpretation was given to the several forms of assistance under this particular wheat scheme, and over 50,000 bushels of wheat were subsequently distributed to farmers. Those participating obtained the grain at cost price (after grading and cleaning) plus 5 per cent. interest; repayment to be made at the end of 1915. Although other factors may have had a bearing on the situation, it can safely be taken for granted that this scheme has resulted in a direct increase of 50 per cent. in the area under wheat in 1915, and at no time in the previous history of cultivation in Queensland has the land been worked up so early in the season. One provision relating to new land intended for cropping distinctively

inferred that such should be ploughed before the 28th February. Such an arrangement, borne out by the experience of Australia's seasons, proved an incentive to others, and in this way cultivation became general. Had the usual monsoonal rains been experienced, it is certain that the stores of moisture which should have found their way into the subsoil would have been sufficient to meet the needs of the new crop. However, dry conditions, which have been so pronounced in the South, seemed to be spreading from the pastoral districts in this State to portions of the wheat-growing belt. Rainfalls were markedly erratic. Lands which were prepared early demonstrated the efficiency of the practice, as the moisture which had fallen was readily absorbed, and as the planting season came round in due course, those favoured fields soon showed a decent germination of grain. Heavy soils which did not possess the property of readily absorbing moisture soon lost in many instances the limited amounts which were precipitated, and once again the heavy black soil country on the Western line and in the Pittsworth district seemed doomed to suffer. Welcome rains were experienced in the latter part of the month of May along a strip of country extending from Toowoomba to Pittsworth on the one side and bearing away to the Warwick district and beyond, practically as far as Goondiwindi. Farmers in these favoured localities who had not already sown their seed in a "dry" seedbed pushed on with seeding operation as rapidly as possible. Their efforts were soon rewarded by the green fields which seemed to spring up as if by magic. In nearly every instance where the rainfall was sufficient a good germination followed, and the prospects in these localities are now of the brightest, assuming, of course, that further rains are experienced to carry on the crops to a successful issue.

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## FARMING WITH DYNAMITE IN THE WEST INDIES.

On 13th December, 1912, Mr. Harry Vincent told the members of the Trinidad Agricultural Society, in his paper on explosives for cultivating the land, entitled "The Agricultural Revolution by the New Cult": "I read my first paper on the subsoil blasting by dynamite to the members of this society,* and this was followed in September, 1913, by a report on the practical experiments that had been carried out. As, in these trials, only 15 acres had been subsoiled in poor patches covering about twelve districts in the colony, the tangible results were hardly striking, except to those who had witnessed the operations. I have now much pleasure in stating to the members that during the past twelve months 218 acres in Trinidad and Tobago have been thoroughly subsoiled—viz., 177 acres of cocoanut cultivation and 41 acres of cacao. I might here mention that nearly a year ago I subsoiled on the Chaguanas Estate 45 acres of growing cocoanuts, and blasted holes in a 12-acre piece for planting young nuts. These were shortly after planted, and the whole acreage operated on forms now a splendid object lesson

* We are indebted to the report of the "Proceedings of the Trinidad Agricultura Society" for the report of this interesting paper.

for agriculturists. This is the opinion of several well-known planters who have personally inspected it. It is not possible at the present time, though I hope it may be later on, to bring specimens of either the cocoanuts or cacao produced on these areas for the inspection of the members, but I can show ears of corn grown on dynamited and undynamited land. This was grown on land at Manzanilla belonging to Mr. G. A. Frost. The field in question was dynamited last June, and shortly afterwards the corn was planted. After reaping, the dynamited portion showed a yield of 41 barrels to the acre, and the undynamited 19 barrels, and, as the members will see, there is a great difference in the appearance of the ears. I should also mention that the field is planted in cocoanuts and cacao, and the dynamited portion has also tannias, yams, cush-cush and plantains, which were planted shortly after the corn, and are now showing a most vigorous growth. In addition, this was the second crop of corn, as it had already given one before being dynamited. On the other hand the undynamited portion had not been planted before. It was its first crop, and, as no other vegetables were planted, presumably all the plant food went to the corn. Messrs. Cunliffe and Ward have kindly taken photographs of the ears, and from these the members will kindly note the comparison. In the same field Professor Cunliffe has applied some of the fertilisers to two different patches of cacao—one dynamited and the other undynamited. The returns from these trees will be carefully noted.

"The majority of planters with whom I have conversed, while agreeing that dynamite is a great aid to agriculture, evidently think that the cost is prohibitive, seemingly oblivious of the fact that it creates a permanent soil improvement for at least six years (in Canada and the United States they reckon ten years). So it is evidently the primary outlay that frightens them.

"Well, let us take the case of this land of Mr. Frost in Manzanilla. It cost him in the vicinity of 35·00 dollars the acre, because he had it thoroughly subsoiled. Against this prime cost he has to offset 41 barrels of corn at 5s. the barrel (more than covering the cost of the dynamite), the value of the vegetables when reaped, and the general improvement, lasting, as I have previously stated, for a period of five years at least.

"I have just learned from Mr. Davis, the Director-General of the Panama-California Exposition to be held at San Diego in 1914, that they had used over 60 tons of dynamite on their grounds for planting trees, and that they will undoubtedly use a great deal more. He states that it has been found necessary to use dynamite to plant every tree that has been set out on the grounds. At this present moment they have set out over 100,000 trees, and have nearly a million more, which have to be set out during the next nine months.

"Now, here in Trinidad, we are fortunate in having very productive land, and even those soils we call poor would be snapped up with avidity by the Connecticut farmer, or, to come nearer home, the Barbadian peasant, and made to bloom like the rose, by means of the handy-man—

dynamite. As an old Trinidad planter I should like to see in the land of my adoption every agriculturist using the aforesaid handy-man for the undermentioned five operations on plantations here.

"*Firstly.*—If used to clear the land, the operation of removing stumps and breaking boulders can be conducted quickly and economically. With an earth auger a hole is quickly bored under a tree or stump, a charge of dynamite put in, and the stump is out, all broken up so that it can be easily handled. In the case of boulders they can be mud-capped with dynamite and the broken pieces used for roads and the foundations of buildings.

"*Secondly.*—In swampy lands that require draining the planter can make with a punch a line of holes, 2 to 3 ft. apart, where he wishes his drain to be, the depth of the holes to be regulated according to the depth of the drain required, and one or two dynamite cartridges placed in each hole. The primed cartridge in the centre of the line is detonated, the explosion spreads from cartridge to cartridge, and 2,000, 3,000, and 5,000 ft. of drain through mud, slime, roots, and rocks has been dug in the twinkling of an eye, and the land drained and made tillable.

"*Thirdly.*—Cacao, cocoanut, citrus or other fruits are to be planted, and trees to form a wind-break or make shade. Under the old method, the roots were wadded into a spade-dug hole, and the tender rootlets found difficulty in spreading into the hard surrounding earth, especially clay. The up-to-date planter bores a hole, drops in half a cartridge of dynamite, and the soil for many feet is rendered fine and loamy, so that the delicate roots are enabled to reach out and draw sustenance from several times the area that could be reached by the roots of the spade-planted tree; and this planter discovers that his trees grow stronger, fruit earlier, stand dry weather better, and bear much more heavily than those of his neighbour, who did not employ that greatest of all hired men—dynamite.

"*Fourthly.*—Wells have to be dug—a very simple matter with dynamite, and they can be lined with broken rocks or boulders. The roads can be put into shape by blasting out the hill sides and filling in the hollows. If rocks remain from the clearing they can be crushed and used as top dressing for roads.

"*Fifthly.*—Land should be prepared preparatory to planting crops like sugar-cane, cotton, corn, &c.; neither plough nor fork penetrates very deep into the soil, with the result that only a few inches of the surface soil is utilised. Again the auger is put to work, and holes are drilled down into the subsoil at intervals of 10 to 15 ft. over the entire field. Half a cartridge is then dropped into each hole and exploded, the entire field thus rendered mellow to a great depth, the larvæ of injurious insects killed, and the soil, which has been made porous, holds the water of the rains in the many minute channels created by the explosion of the dynamite, and feeds the waters thus held to the thirsty plants in the dry season, when those in the fields prepared in the old fashion are withered and dying.

"In conclusion, I should say that, although both soil and cultivation derive undoubted benefit when the fields in growing crops are dynamited, it is preferable when possible to prepare the land before planting, so as to give the plant every possible advantage during the most delicate stages of its life. While recently operating on a cocoanut plantation amongst old trees, the initial blast (a whole ½-lb. cartridge sunk at a depth of 3 ft.) disclosed at a depth of 14 in. a solid stratum of limestone rock, varying in thickness from 9 in. to 2 ft.—a very solid impediment to the young roots of any tree.

"I still have over a ton of cartridges on hand, and I am prepared to undertake the task of dynamiting land for the planting of cocoanuts at 10 dollars per acre, and for my sugar friends, who look as if they were going to have a good time in the near future, I will thoroughly prepare their heavy clay lands, cracking up the subsoil to a depth of 30 in., at 35 dollars an acre.

"The price sounds big, but when it is remembered that an acre will take between 1,500 and 2,000 plants, and the yield will be increased by at least a ton of sugar, the output will well justify the extra expense. These prices will cover the cost of explosives and my instruction and supervision, the estate providing the labour for holing, &c."—"Tropical Life."

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## COMPLETE FERTILISERS FOR FARM, ORCHARD, AND VEGETABLE GARDEN.

### CAULIFLOWERS.

Cauliflowers require a very rich loam, and, like cabbages, a heavy dressing of farmyard manure.

When using from 10 to 15 tons of stable manure per acre, when the ground is being prepared, the following mixture of artificial fertilisers should be applied, per acre, when planting:—

4 to 6 cwt. of superphosphate;
1 to 2 cwt. of sulphate of potash;
2 to 3 cwt. of nitrate of lime;

the latter to be applied in two dressings.

Without farmyard manure use—

6 cwt. of superphosphate
2 cwt. of sulphate of potash
2 cwt. of nitrolim or sulphate of ammonia
} per acre

when planting, and two or three topdressings of 1 cwt. of nitrate of lime each.

### CARROTS.

Carrots do best on a rich sandy loam, deeply cultivated and well drained. Stable manure should never be applied immediately before this crop is grown, but rather the preceding year.

Apply per acre—

4 to 6 cwt. of superphosphate;
1 to 2 cwt. of sulphate of potash;
2 cwt. of nitrolim or sulphate of ammonia;

and two topdressings of 1 cwt. of nitrate of lime each.

## CELERY.

This vegetable requires a deep, rich, vegetable mould in a moist situation. When preparing beds or trenches, lay in at the bottom about 4 in. of well-rotted stable manure, which is to be well forked in. A heavy dressing of an artificial fertiliser containing from 6 to 10 per cent. of soluble phosphoric acid, 6 to 8 per cent. of potash, and 4 to 6 per cent. of nitrogen, should also be applied, using about 6 cwt. per acre, previous to planting out, and two or three topdressings of 1 cwt. each.

The use of liquid manure and sprinkling with a little salt are also to be recommended.

Instead of the ready mixed fertiliser, the following mixture may be used with advantage:—

3 cwt. superphosphate
1½ cwt. sulphate of potash
2 cwt. nitrolim, or sulphate of ammonia
} per acre

at the time of planting, followed by two topdressings with a mixture of—

1 cwt. superphosphate
½ cwt. sulphate of potash
1 cwt. nitrate of lime
} per acre.

In this case muriate of potash may with advantage replace the sulphate of potash.

## CORN (MAIZE).

Corn does best in a deep, sandy loam, rich in humus, and not containing too much clay. This crop makes a heavy demand on plant foods, particularly when grown for **ensilage** or **green fodder,** and farmyard manure used in combination with artificial fertiliser gives the best results. Apply in the drills, when planting, any of the following mixtures:—

2 to 4 cwt. of superphosphate
½ to 1½ cwt. of sulphate of potash
2 to 1 cwt. of sulphate of ammonia or nitrolim
} per acre;

or,

3 to 5 cwt. of bonemeal
½ to 1½ cwt. of sulphate of potash
1 to 1½ cwt. of dried blood, or nitrate of lime
} per acre;

or,

from 3 to 5 cwt. of a fertiliser mixture containing 7 to 10 per cent. phosphoric acid (chiefly water-soluble), from 3 to 4 per cent. of nitrogen, and from 6 to 8 per cent. of potash. Part of the manure, 2 to 3

cwt., may be applied when sowing, and 1 cwt. or more between the drills before hilling.

When maize is grown for grain, the amounts of artificial fertilisers may be varied, and in a rich soil the manure supplying nitrogen left out altogether, using per acre—

3 cwt. of superphosphate;
1 cwt. of sulphate of potash.

In a poor soil about ½ cwt. of dried blood or of nitrolim may be added.

## COWPEAS.

This crop is chiefly grown as a green manure crop, but makes a very nutritious hay and chaff, and the pods may be eaten as a vegetable. This leguminous plant prefers a fairly rich sandy loam, which must contain a liberal amount of lime.

Apply per acre from 5 to 6 cwt. of a mixed fertiliser containing from 7 to 9 per cent. of soluble phosphoric acid, and 9 per cent. of potash, or use one of the following fertilisers:—

2 cwt. superphosphate
3 cwt. kainit } per acre;

or,

2 cwt. superphosphate
¾ to 1 cwt. muriate of potash } per acre;

or,

3 cwt. Thomas phosphate
¾ to 1 cwt. of muriate of potash or sulphate of potash } per acre.

One half of the manure can be broadcasted and the other half applied in the drills when planting.

Although as a rule no nitrogen needs to be applied, in many instances, when grown as a green manure on poor, exhausted soils, the addition of a little nitrate of lime, or of nitrolim, in the drills, at the rate of ½ cwt. per acre, may be very beneficial.

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## WEEDS IN YOUNG LUCERNE.

Provided that young lucerne is well rooted, and has taken a firm hold, it may be cut at about 4 in. from the ground level. This will encourage it to branch out and form a "crown." It is customary to harrow after cutting a young crop choked with weeds, in order to get rid of them, and if the crop is sufficiently established to admit of a light harrowing, preferably with lever harrows—*i.e.*, those which can be adjusted to admit of the tines sloping back at an angle so as not to disturb the young lucerne—it will be found quite satisfactory.

## REPORT ON CORN-GROWING COMPETITION, 1914-15.

In making known the awards in connection with the judging of the corn-growing competition, it is essential that the rules under which the contest was conducted should be stated. These read as follow:—

1. This competition will be open to all under the age of eighteen years, who are residents of the State of Queensland. An entrance fee of 2s. 6d. must be forwarded to the Under Secretary with the application to enter.

2. Applications to be enrolled in the competition containing the following particulars must reach the Under Secretary, Department of Agriculture and Stock, Brisbane, not later than 12 noon on 21st September, 1914:—

(*a*) Full name and address.
(*b*) Age at last birthday and date of birth.
(*c*) Occupation.
(*d*) District in which applicant resides.

3. The area to be devoted to the planting of the seed maize shall be one-tenth of an acre, selected seed for which will be supplied free of cost; but one parcel only will be supplied to each competitor during the period of the competition.

4. Each competitor shall have absolute freedom in his choice of ground, and in the methods he may adopt in preparing, planting, and cultivating his plot, but in no case shall a plot exceed one-tenth of an acre, otherwise disqualification will be incurred.

The following table shows the length the rows must be to give the exact area according as 4, 5, 6 or more rows are planted:—

| Number of Rows 4 feet apart. | Length of Rows in Feet. | Number of Rows 4 feet apart. | Length of Rows in Feet. |
|---|---|---|---|
| 4 | 272 feet 3 inches | 8 | 136 feet 1½ inch |
| 5 | 217 feet 10 inches | 12 | 90 feet 9 inches |
| 6 | 181 feet 6 inches | 16 | 68 feet |
| 7 | 155 feet 7 inches | | |

5. Each competitor will be required to keep a record chart showing the dates and particulars of the different stages of work, and these charts are to be delivered, at the time of harvesting, to the officer appointed for superintending and verifying the yield. Duplicate forms for recording all work done and observations made on the plots will be supplied to each competitor.

6. Within seven days from the verification of the yield from the crop, each competitor shall select, without aid from other persons, ten

cobs of the maize from his crop and forward them to the Principal of the Queensland Agricultural College, Gatton. Labels for this purpose will be supplied.

7. Competitors must notify the Under Secretary of the date when the crop shall have matured and be ready for inspection.

8. No competitor shall be allowed to employ or permit any labour upon the competition plot standing in his name, other than his own personal labour, excepting in relation to the driving of horses, for which, owing to circumstances, such help may be needed.

9. The competition will close on the 30th June, 1915, and the prizes will be allotted thus: The competitors will be grouped according to the following districts:—

(1) LOGAN.—From the Coast to Six Mile Creek, by railway line, then in south-west direction to Mount Lindsay, border of New South Wales.

(2) WEST MORETON.—From the Logan boundary on the east to the Main Range, north to Yarraman, south-west to border of New South Wales.

(3) DARLING DOWNS NORTH.—To and including Greenmount, Pittsworth, Jondaryan, Goombungee, Crow's Nest, Spring Bluff, Oakey, Drayton.

(4) DARLING DOWNS SOUTH.—Including Nobby to Wallangarra, Texas, Goondiwindi, Killarney, Freestone, Leyburn, Condamine, Yandina, Darkey's Flat, Clifton, Allora, Millmerran.

(5) MARANOA.—From and including Dalby to Charleville, Mitchell, Morven, Cunnamulla, Mungindi, St. George, Surat.

(6) MORETON.—From and including Nundah, North Pine, Nudgee, Caboolture, Woodford, Kilcoy, Sandgate, Samford, Samson Vale, Humpybong, Maroochy, Eumundi; northern boundary to include parishes of Kenilworth, Maleny, and Conondale, thence south by Mary River.

(7) WIDE BAY AND BURNETT.—From the coast and including Biggenden, Kilkivan, Nanango, Gayndah, Tewantin, Degilbo, Pialba, Howard, Maryborough, Gympie, Bundaberg, Childers, Gin Gin, Isis, Mount Perry, Eidsvold. Northern boundary, 24½ degrees of latitude, Dawson River on west.

(8) CENTRAL QUEENSLAND.—From 24½ degrees of latitude to and including St. Lawrence, Gladstone, Rockhampton, Mount Morgan, Emerald, Jericho, Springsure, Clermont, Aramac, Longreach.

(9) NORTH QUEENSLAND.—North of St. Lawrence to and including Mackay, Bowen, Townsville, Cairns, Cooktown, Atherton, Charters Towers, Ravenswood, Winton, &c.

If there are more than ten competitors in any district three prizes will be awarded for competition in that district; less than ten competitors, one prize only.

The prizes shall be of the following value:—First, £5; second, £2; third, £1.

No money prizes will be given, but each successful competitor will be allowed to select some article to the value of his prize.

The prizes awarded in any district may be increased in number and value by donations from persons, firms, or societies who may be interested in the competition.

10. Three special prizes of the value of £10, £5, and £3 will be awarded to the competitors who stand first, second, and third in the entire competition.

These prizes may be increased in number and value in the same way as is indicated above in connection with the district competitions.

11. The aggregate points will be 100 and the judging will be based upon the following:—

(*a*) Quality of the maize produced.
(*b*) Yield of plot.
(*c*) Notes and records of plot.

12. Arrangements will be made for such of the competitors as may so desire to travel by rail to the Agricultural College during the week when the judging is decided, when instruction in corn-growing and judging will be afforded.

13. The Principal of the Queensland Agricultural College will be the sole judge of the competition, and his decision shall be final.

That the contest created keen interest is shown by the numerous entries received from the various maize-growing areas throughout Queensland, as follow:—

| | Entries. | Adjudicated. |
|---|---|---|
| Wide Bay and Burnett | 85 | 28 |
| West Moreton | 61 | 29 |
| Darling Downs (North) | 38 | 11 |
| Darling Downs (South) | 24 | 6 |
| Moreton | 19 | 5 |
| Central Queensland | 18 | 6 |
| North Queensland | 18 | 4 |
| Maranoa | 24 | 5 |
| Logan | 9 | 5 |
| Totals | 296 | 99 |

Unfortunately, during the growing period adverse climatic conditions prevailed over the whole area represented, and this was the means of reducing the yields to such an extent that many of the competitors did not make application to have their plots adjudicated. Several lots of cobs came to hand without any name attached, thus creating some trouble in tracing the owners, while five lots from inspected plots failed to reach us. Two competitors were disqualified through a flagrant breach of the rules. No fewer than fifteen girls entered the lists, two of them securing prizes. It may be pointed out that this contest is a corn-growing and not a corn-cob competition, as erroneously spoken of by several. The scale of points allotted in the two cases would be quite

distinct. The awards were made in accordance with Rule 11, the points given being as follow:—

| | Points. |
|---|---|
| Yield .. .. .. .. .. .. | 76 |
| Quality .. .. .. .. .. .. | 14 |
| Notes and Records .. .. .. .. | 10 |
| Maximum .. .. .. .. .. | 100 |

In regard to yield, 70 points were allotted for a crop of 100 bushels per acre; this made provision for a maximum yield of 108 bushels, which was not exceeded. The crops from the respective plots were harvested and weighed in husked cobs in the presence of an officer of the Agricultural Department. Instead of giving the weight of cobs, I have set out in the award sheet the yield as bushels of shelled corn per acre. This conversion is arrived at by deducting 14 per cent. for core or pith. The cobs, on the whole, were very good, but the unfavourable season was evidenced in many cases by the poorly filled tips. Many competitors made the mistake of forwarding the ten largest cobs for judging, irrespective of quality. This was pointed out to some twenty-five contestants who visited the College during the week the awards were made. Although a number of the competitors gave a fairly full description of the various operations carried out, together with the difficulties experienced, yet the majority contented themselves with simply entering the dates of cultivating, planting, and harvesting. The following are the awards:—

## DISTRICT PRIZE WINNERS.

| | Points. | £ | s. | d. |
|---|---|---|---|---|
| West Moreton— | | | | |
| J. R. C. Hart, Blackbutt .. .. .. | 86·4 .. | 5 | 0 | 0 |
| F. A. Bade, Rosewood .. .. .. | 65·8 .. | 2 | 0 | 0 |
| A. M. Bachmann, Marburg .. .. | 60·7 .. | 1 | 0 | 0 |
| Darling Downs (North)— | | | | |
| N. S. Smoothy, Pinelands .. .. .. | 77·1 .. | 5 | 0 | 0 |
| H. W. Abel, Geham .. .. .. .. | 74·9 .. | 2 | 0 | 0 |
| F. Franke, Cawdor .. .. .. .. | 72·2 .. | 1 | 0 | 0 |
| Darling Downs (South)— | | | | |
| Albert Gonchee, North Killarney .. .. | 72·5 .. | 5 | 0 | 0 |
| Archibald Gonchee, North Killarney .. | 49·5 .. | 2 | 0 | 0 |
| A. E. Ernst, Spring Creek, Clifton .. | 44·1 .. | 1 | 0 | 0 |
| Maranoa— | | | | |
| F. R. Rowland, Bell .. .. .. | 29·7 .. | 5 | 0 | 0 |
| (Less than ten competitors; one prize only.) | | | | |
| Moreton— | | | | |
| R. Rudd, Upper North Pine .. .. | 56·4 .. | 5 | 0 | 0 |
| F. Woodward, Samford .. .. .. | 49·9 .. | 2 | 0 | 0 |
| S. R. Hulse, Yandina .. .. .. | 48·3 .. | 1 | 0 | 0 |
| Logan— | | | | |
| F. M. Birt, Nerang .. .. .. .. | 46·8 .. | 3 | 10 | 0 |
| E. L. Marshall, Gramzow .. .. .. | 46·8 .. | 3 | 10 | 0 |
| R. A. Tulloch, Veresdale .. .. .. | 41·3 .. | 1 | 0 | 0 |

| | Points. | £ | s. | d. |
|---|---|---|---|---|
| Burnett and Wide Bay— | | | | |
| A. Fittell, Eel Creek, Gympie .. .. | 63·9 | 5 | 0 | 0 |
| F. H. J. Hayden, Kingaroy .. .. | 59·5 | 2 | 0 | 0 |
| E. Hayden, Kingaroy .. .. .. | 51·1 | 1 | 0 | 0 |
| Central Queensland— | | | | |
| R. J. Philp, Mount Larcom .. .. | 58·1 | 5 | 0 | 0 |
| Isabella Wilson, Yeppoon .. .. .. | 57·9 | 2 | 0 | 0 |
| F. Williams, Barmoya .. .. .. | 44·4 | 1 | 0 | 0 |
| North Queensland— | | | | |
| Mary R. Dougherty, Malanda .. .. | 72·4 | 5 | 0 | 0 |
| J. D. Gellweiler, Kulara, Cairns .. .. | 58·7 | 2 | 0 | 0 |
| R. Vance, Barrine .. .. .. .. | 47·2 | 1 | 0 | 0 |

## SPECIAL PRIZE WINNERS, ENTIRE COMPETITION.

J. R. C. Hart, Blackbutt (West Moreton) .. .. .. .. .. £10
N. S. Smoothy, Pinelands, Crow's Nest (Darling Downs, North) .. £5
H. W. Abel, Geham, Crow's Nest (Darling Downs, North) .. £3

The following is a complete record of the points allotted in the competition:—

### WEST MORETON DISTRICT.

| Name and Address of Competitor. | Age of Competitor. | YIELD. Maximum Yield. 76 points. | | QUALITY. Quality of Grain and Uniformity of Cob. 14 points. | Notes and Records. 10 points. | Total Points. 100. |
|---|---|---|---|---|---|---|
| | | Bushels. | Points. | | | |
| J. R. C. Hart, Blackbutt .. | 16 | 92 | 64·4 | 13 | 9 | 86·4 |
| F. A. Bade, Rosewood .. | 13 | 69 | 48·3 | 12 | 5·5 | 65·8 |
| A. M. Bachmann, Marburg .. | 10 | 56 | 39·2 | 12 | 9·5 | 60·7 |
| W. N. Strasburg, Walloon .. | 12 | 53 | 37·1 | 10 | 7·5 | 54·6 |
| A. Tapsall, Coominya .. | 14 | 41 | 37·7 | 10 | 4·0 | 51·7 |
| S. J. Griffiths, Rosewood .. | 16 | 52 | 36·4 | 10 | 5 | 51·4 |
| W. Peters, Glenore Grove .. | 16 | 48 | 33·6 | 9 | 7 | 49·6 |
| Alf. Henning, Toogoolawah | 14 | 52 | 36·4 | 9 | 4 | 49·4 |
| D. A. Logan, Bundamba .. | 16 | 49 | 34·3 | 9 | 5 | 48·3 |
| Arthur Henning, Toogoolawah | 12 | 49 | 34·3 | 9 | 4 | 47·3 |
| N. D. Alexander, Ipswich .. | 12 | 45 | 31·5 | 10 | 4 | 45·5 |
| W. J. Zabel, Minden .. | 13 | 43 | 30·1 | 8 | 4 | 42·1 |
| J. B. Campbell, Milora .. | 13 | 38 | 26·6 | 10 | 5 | 41·6 |
| R. S. Turner, Grantham .. | 13 | 34 | 23·6 | 10 | 5 | 38·8 |
| G. Osborne, Mount Alford .. | 13 | 32 | 22·4 | 10 | 6 | 38·4 |
| N. H. Bade, Rosewood .. | 13 | 36 | 25·2 | 8 | 4 | 37·2 |
| F. H. Beduhn, Rosewood .. | 12 | 33 | 23·1 | 9 | 5 | 37·1 |
| F. Muller, Engelsburg .. | 15 | 32 | 22·4 | 8 | 5 | 35·4 |
| W. Campbell, Milora .. | 12 | 32 | 22·4 | 8 | 4 | 34·4 |
| E. Semph, Hatton Vale .. | 12 | 33 | 23·1 | 7 | 4 | 34·1 |
| C. V. Smith, Ma Ma Creek .. | 11 | 31 | 21·7 | 8 | 4 | 33·7 |
| H. F. Nitz, Forest Hill .. | 17 | 27 | 18·9 | 8 | 6 | 32·9 |
| W. J. Muller, Rosewood .. | 15 | 21 | 16·4 | 9·5 | 5 | 30·9 |
| A. F. Scott, Grantham .. | 16 | 28 | 19·6 | 7 | 4 | 30·6 |
| H. Rosenberg, Ma Ma Creek | 13 | 26 | 18·2 | 7 | 4 | 29·2 |
| A. W. Hunt, Dugandan .. | 16 | 20 | 14 | 9 | 4 | 27 |
| A. H. Evans, Ma Ma Creek | 9 | 17 | 11·9 | 8 | 5 | 24·9 |
| Bertha Ziebell, Hatton Vale | 13 | 18 | 12·6 | 8 | 4 | 24·6 |
| J. K. Martin, Helidon .. | 13 | 13 | 9·1 | 7 | 4 | 20·1 |

## WIDE BAY AND BURNETT DISTRICT.

| Name and Address of Competitor. | Age of Competitor. | Yield. Maximum Yield. 76 Points. Bushels. | Yield. Maximum Yield. 76 Points. Points. | Quality. Quality of Grain and Uniformity of Cob. 14 Points. | Notes and Records. 10 Points. | Total Points. 100. |
|---|---|---|---|---|---|---|
| A. Fittell, Eel Creek, Gympie | 14 | 67 | 46·9 | 13 | 4 | 63·9 |
| F. H. J. Hayden, Kingaroy | 14 | 55 | 38·5 | 12 | 9 | 59·5 |
| E. Hayden, Kingaroy .. | 13 | 48 | 33·6 | 12 | 7 | 51·1 |
| W. Norman, Biggenden .. | 17 | 41 | 29·1 | 10·5 | 5 | 45·6 |
| C. H. J. Strandquist, Murgon | 12 | 40 | 28 | 9·5 | 6·5 | 44 |
| G. Bubke, Biggenden .. | 13 | 38 | 26·6 | 9·5 | 6 | 42·1 |
| B. W. D. Wadsworth, Gin Gin | 14 | 38 | 26·6 | 10 | 5·5 | 42·1 |
| H. Frehmann, Binjour Plateau | 13 | 40 | 28 | 9·5 | 4 | 41·5 |
| A. F. Birt, Kingaroy .. | 16 | 33 | 23·1 | 10 | 8 | 41·1 |
| E. C. Andersen, Tingoora .. | 14 | 37 | 25·9 | 11 | 4 | 40·9 |
| W. Weick, Memerambi .. | 10 | 40 | 28 | 9 | 3·5 | 40·5 |
| H. V. Horne, Coolabunia .. | 14 | 33 | 23·1 | 10·5 | 6 | 39·6 |
| W. A. Strandquist, Murgon | 10 | 37 | 25·9 | 9·5 | 4 | 39·4 |
| L. E. Nystron, Booie .. | 13 | 35 | 24·5 | 8 | 6 | 38·5 |
| A. Nielsen, Bundaberg .. | 14 | 33 | 23·1 | 7 | 4·5 | 34·6 |
| J. J. Nielsen, Bundaberg .. | 15 | 31 | 21·7 | 8 | 4·5 | 34·2 |
| J. Kincaid, Wongarra .. | 16 | 25 | 17·5 | 9·5 | 6 | 33 |
| W C. Andersen, Tingoora .. | 14 | 23 | 16·1 | 10 | 5 | 31·1 |
| H. E. Horne, Coolabunia .. | 12 | 23 | 16·1 | 12·5 | No chart | 28·6 |
| R. Buttsworth, Taabinga Village | 15 | 15 | 10·5 | 7 | 8 | 25·5 |
| M. R. Jackson, Biggenden .. | 13 | 13 | 9·1 | 7 | 6·5 | 22·6 |
| F. E. Faint, Dallarnil .. | 11 | 9 | 6·3 | 4 | 4 | 14·3 |
| C. Bischoff, Murgon .. | 17 | 24·6 | 16·8 | No cobs came to hand. | 7 | .. |
| J. K. Clark, Kalkie, Bundaberg | 15 | 24·5 | 16·8 | | 5 | .. |
| J. V. G. Poulsen, Kingaroy | 13 | 27·5 | 18·9 | | 6½ | .. |
| Allan Kenny, Gayndah .. | 13 | 20·6 | 14 | | 6 | .. |

## DARLING DOWNS (NORTH).

| | | | | | | |
|---|---|---|---|---|---|---|
| N. S. Smoothy, Pinelands .. | 16 | 83 | 58·1 | 11 | 8 | 77·1 |
| H. W. Abel, Geham .. .. | 15 | 82 | 57·4 | 11·5 | 6 | 74·9 |
| F. Franke, Cawdor .. .. | 14 | 76 | 53·2 | 13 | 6 | 72·2 |
| L. J. Abel, Geham .. .. | 12 | 70·2 | 49·1 | 11·5 | 7 | 67·6 |
| W. G. Stark, Pinelands .. | 14 | 68·9 | 48·2 | 10 | 5 | 63·2 |
| A. F. Abel, Geham .. .. | 14 | 65·9 | 46·1 | 11·5 | 5 | 61·6 |
| S. Fitch, Pinelands .. .. | 15 | 49 | 34·3 | 10 | 6 | 50·3 |
| N. Kruger, Bergen .. .. | 13 | 41 | 28·7 | 8·5 | 4 | 41·2 |
| R. Littleton, Pinelands .. | 14 | 39 | 27·3 | 8·5 | 4 | 39·8 |
| E. M. Schefe, Bergen .. | 16 | 28 | 19·6 | 8 | 9 | 36·6 |
| I. E. R. Elliot, Cambooya .. | 12 | 29 | 20·3 | 10·5 | 4 | 34·8 |

## DARLING DOWNS (SOUTH).

| | | | | | | |
|---|---|---|---|---|---|---|
| Albert Gonchee, North Killarney | 17 | 74·7 | 52·5 | 12 | 8 | 72·5 |
| Archibald Gonchee, North Killarney | 15 | 44·5 | 31·5 | 10 | 8 | 49·5 |
| A. E. Ernst, Spring Creek, Clifton | 13 | 42·8 | 30·1 | 10 | 4 | 44·1 |
| E. W. Wagland, Spring Creek, Clifton | 13 | 33 | 23·1 | 9 | 10 | 32·1 |
| F. Bishop, King's Creek .. | 13 | 30 | 21 | 9 | 5 | 35 |
| P. Clegg, Pratten .. .. | 10 | 12 | 8·4 | 8 | 6 | 22·4 |

MORETON DISTRICT.

| Name and Address of Competitor. | Age of Competitor. | Yield. | | Quality. | Notes and Records. | Total Points. |
|---|---|---|---|---|---|---|
| | | Maximum Yield. | | Quality of Grain and Uniformity of Cob. | | |
| | | 76 Points. | | 14 Points. | 10 Points. | 100. |
| | | Bushels. | Points. | | | |
| R. Rudd, Upper North Pine | 12 | 52 | 36·4 | 12 | 8 | 56·4 |
| F. Woodward, Samford .. | 17 | 47 | 32·9 | 11 | 6 | 49·9 |
| S. R. Hulse, Yandina .. | 13 | 47·6 | 33·3 | 11 | 4 | 48·3 |
| L. Morrison, Samford .. | 11 | 46 | 32·2 | 10 | 4 | 46·2 |
| E. Brandenburg, Landsborough | 16 | 37 | 25·9 | 9 | 4 | 38·9 |
| MARANOA DISTRICT. | | | | | | |
| F. R. Rowlands, Bell .. | 17 | 22 | 14·7 | 10 | 5 | 29·7 |
| R. J. Bullock, Chinchilla .. | 9 | 7 | 4·9 | 9 | 7 | 20·9 |
| N. C. Bullock, Chinchilla .. | 12 | 8 | 5·6 | 8 | 7 | 20·6 |
| F. W. Bullock, Chinchilla .. | 14 | 7 | 4·9 | 8 | 7 | 19·9 |
| J. S. Bullock, Chinchilla .. | 16 | 5 | 3·5 | 6 | 7 | 16·5 |
| LOGAN DISTRICT. | | | | | | |
| F. M. Birt, Nerang .. .. | 16 | 41·2 | 28·8 | 12 | 6 | 46·8 |
| E. L. Marshall, Gramzow .. | 13 | 44 | 30·8 | 10 | 6 | 46·8 |
| R. A. Tulloch, Veresdale .. | 15 | 39 | 27·3 | 7 | 7 | 41·3 |
| E. Wolff, Alberton .. .. | 9 | 33 | 23·1 | 6 | 4 | 33·1 |
| W. J. Schlort, Buccan .. | 13 | 27 | 18·9 | 5 | 7 | 30·9 |
| CENTRAL QUEENSLAND. | | | | | | |
| R. J. Philp .. .. .. | 16 | 72·9 | 51·1 | No cobs. | 7 | 58·1 |
| Isabella Wilson, Yeppoon .. | 17 | 62·3 | 43·4 | 9·5 | 5 | 57·9 |
| F. Williams, Barmoya .. | 14 | 41·9 | 29·4 | 10 | 5 | 44·4 |
| R. V. Williams, Barmoya .. | 11 | 41·3 | 28·7 | 9·5 | 5 | 43·2 |
| F. Jones, Raglan .. .. | 15 | 31 | 21·7 | 11 | 4 | 36·7 |
| F. Stobart, Tanby .. .. | 9 | 22 | 15·4 | 8 | 10 | 33·4 |
| J. Williams, Stanwell .. | 16 | 18 | 12·6 | 7·5 | 8 | 28·1 |
| NORTH QUEENSLAND. | | | | | | |
| M. R. Dougherty, Malanda, Cairns | 16 | 82 | 57·4 | 8·5 | 6·5 | 72·4 |
| J. D. Gellweiler, Kulara .. | 13 | 61 | 42·7 | 12 | 4 | 58·7 |
| R. Vance, Barrine .. .. | 13 | 46 | 32·2 | 9·5 | 6·5 | 47·2 |
| F. G. Reid, Peeramon .. | 15 | 44·3 | 31 | 7·5 | 7 | 45·5 |

G. B. BROOKS, Acting Principal,
Adjudicator.

## REFINERY LIME REFUSE FOR THE LAND.

Mr. J. C. Brünnich, Agricultural Chemist, says that the lime refuse of a sugar refinery makes a good substitute for limestone screenings, and should be applied at the rate of 2 tons per acre. With respect to artificial fertilisers, it is always advisable to vary such as are applied, from season to season. Apply one year, bonedust with an addition of potash; other years, meatworks manure and potash; and, again, superphosphates, nitrolim, and potash.

# Pastoral.

## THE VALUE OF GOAT'S MILK.

There is a widespread belief that goat's milk has some peculiar flavour, rendering its use for domestic purposes unpleasant. This impression, however, has been gathered in Switzerland, and apparently arose from some peculiarity in the feeding. In Switzerland goats are allowed to wander at will, and as they have a fancy for strange and pungent herbage, the flavour of this food is imparted to the milk. But this will not be found to affect the milk of goats in this country. Here it has no flavour to distinguish it from cow's milk, except perhaps its superiority in sweetness and creaminess, but if they eat young gum leaves or any plant with a pungent odour, the milk will be tainted. In Bryan Hook's book on milch goats the analyses of goat's and cow's milk is as follows:—

| | Goat's Milk. Per Cent. | Cow's Milk. Per Cent. |
|---|---|---|
| Water | 83·21 | 87·56 |
| Butter fat | 7·30 | 3·63 |
| Casein | 4·18 | |
| Milk Sugar | 4·10 | 8·81 |
| Ash | 1·21 | |
| | 100·00 | 100·00 |

Thus, it will be seen that while the cow's milk contains 12·44 per cent. of solids, the goat's milk can boast of 16·79 per cent. Moreover, in the most important ingredient, *i.e.*, butter-fat, the goat shows a percentage nearly double that of the cow. The most important of all the qualities of goat's milk, especially in relation to its adaptability to the feeding of infants, is its immunity from the danger of carrying the germs of tubercular disease, thus obviating the necessity for boiling, the goat not being liable to tuberculosis. Goat's milk is very much easier of digestion than that of the cow, the reason being the extreme minuteness of the fat particles.

The making of butter from goat's milk is an important one to the goatkeeper. Goat's butter, though, perhaps, not superior in flavour to that of cows, is at least as good, and has, moreover, the advantage of freedom from the germs of tuberculous disease.

The methods in common use for churning fail to extract anything like the quantity of butter which analysis shows the goat's milk to contain. Of several methods tried for the production of goat's cream and butter, the best, according to Mr. Hook, is the ordinary Devonshire one of scalding the milk, as in this way greater time can be allowed for the cream to rise. The milk, having stood in the tin pan for twelve hours, is placed upon the stove until a ring appears upon the wrinkled surface of the cream of the size of the bottom of the pan. When this appearance is noticed, and just before the milk boils, it must be taken off and allowed to stand in the dairy for another twelve hours,

when it is skimmed, and the milk will be found sweet and drinkable. The cream thus obtained having soured in the cream bowl, can be whipped into butter in a few minutes with an ordinary egg-whisk. This butter is absolutely white and might be mistaken for lard, and as this appearance is disliked by many persons, a little butter-colouring may be added.

## YIELD OF BUTTER.

From a goat yielding two quarts of milk daily, 17 oz. of butter will result from a week's milking. This seems a small quantity, but it must be remembered that the remaining skim milk, amounting to 3½ gallons, would be of a quality far superior to that obtained were the butter more perfectly extracted, and would be little poorer than ordinary new cow's milk.

Thus, it will be seen that a single goat, in full profit, would supply both butter and milk enough for the consumption of three persons.

## GOAT'S MILK CHEESE.

Another use for the superabundant produce of the goat is the manufacture of cheese, which, by the use of rennet, is an extremely easy operation, and yields a very excellent result nearly resembling Stilton. The cheese will, however, not keep more than four or five weeks. The recipe is as follows:—The milk having been warmed to about the temperature it has when fresh drawn, the rennet is added, and quickly stirred in, and the milk allowed to stand for an hour, when it will have cooled, and set into a firm curd. This curd having been broken up with a fork, a kettle of water, rather hotter than the hand can bear, is added, and the whole well stirred. In a few minutes, the washed curd will have settled, and the whey and water may be strained off. The curd is then put into a butter cloth under pressure, the cloth being changed, the pressure increased, and the curd turned over every day. In three or four days the cheese will be made, and only requires to be ripened for ten or fifteen days on a shelf, being turned over daily.

The curd may be produced by the judicious application of heat, without the use of rennet at all, and this method, being inexpensive, is most desirable.

In Switzerland, no rennet seems to be used, the peasants turning the milk by placing it in huge cauldrons upon the fire.

## THE GOAT'S RATIONS.

A full-grown goat at liberty will collect a wonderful amount of food in a short time, leaving its mastication to be accomplished at leisure. This hastily gathered food is stowed in a stomach on the left side, and a goat that has laid in a good stock of material for rumination presents an amusingly lop-sided appearance.

For goats which are constantly stalled, the morning ration consists of a double handful of bran (dry), to which should be added lucerne chaff, At midday, an armful of lucerne hay or coarse grass. The evening meal is the same as that for the morning. Grass is the natural staple diet of an animal at pasture, but the goat's love of change leads it to eat

leaves and twigs which come within its reach. The grasses most relished are those of a hard, wiry nature. Goats seldom suffer from eating poisonous plants, as they instinctively avoid noxious plants.

### RETURNS.

Suppose a goat to yield daily 4 pints of milk. At 6d. per quart (the price of cow's milk in Brisbane) this amounts to about £1 10s. per month, whilst one-third of water may be added to the milk, and even then it is richer than cow's milk (excepting for the making of junket).

### THE COST OF RATIONS.

This, as per quantities of feed above stated, amounts to about 7s. 6d. per month, when feed is at ordinary prices. How does the cost of producing goat's milk compare with that of cow's milk. For a family of four, with economy, 3 pints daily of cow's milk, at 6d. per quart, is sufficient, the cost for a month being £1 2s. 6d. But the goat gives 4 pints daily of a value of £1 10s. per month. The cost of feeding a cow having access to pasture is, on an average, £3 per month; of a goat 7s. 6d.

Then, as to butter, as before, with economy, a family of four will use about 2 lb. per week, at a cost of 2s. 2d. per lb. The goat produces over 1 lb. per week plus the milk, which the purchaser of butter does not receive.

Taking all the advantages claimed for the goat, it may well deserve the name of the "poor man's cow."

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## LAMBING EWES DYING.

A correspondent lately wrote to the Chief Inspector of Stock, Brisbane, stating that some lambing ewes had died, that others appeared to be sick, walking round in one spot as if giddy, and that one fat ewe had tuberculous ulcerations, or what appeared to be such, on the intestines, the liver, moreover, being pale.

The District Inspector of Stock at Killarney, Mr. H. C. Hawthorn, advised that the sheep be placed on better feed, if possible, and be given salt. Mr. W. G. Brown, Instructor in Sheep and Wool, to whom the case was also referred, stated that the trouble is a very common one just now, and is directly attributable to the dry condition now prevailing over the greater part of Queensland. It is necessary that ewes about to lamb should have laxative food, such as green grass, lucerne, or any other growing fodder. In the absence of these, it is often advisable to drench the ewes with a 3-oz. dose of Epsom salts in the proportion of 6 lb. of Epsom salts to 10 gallons of water. If the sheep have access to salt, all the better, but add 5 or 6 lb. of Epsom salts to one bag of, say, 180 lb. salt.

The nodules, or apparent ulcerations, are due to the nodule worm (*Oesophagostona columbianum*), and these do not cause serious injury to the health of sheep. Tuberculosis is rarely found in sheep—certainly not in Australia.

## DISEASES OF CATTLE.

*Blackleg.*—All young cattle, where blackleg has once made its appearance, should be inoculated with blackleg vaccine, which can be obtained, with full particulars, from the Government Bacteriologist, Stock Experiment Station, Yeerongpilly.

*Disease of the Eye in Calves.*—The most common disease that affects the eye, in this State, is blight, and the treatment recommended is as follows:—Nitrate of silver, 5 gr.; distilled water, 1 oz. This lotion should be painted onto the affected eye daily with a feather.

*Footrot in Cattle.*—This may be brought about in several different ways. First of all, the cause should be found, and at once removed. The most common cause is sand and dirt becoming inserted between the hoofs and causing scalding. If this is the cause, the foot should be thoroughly washed in warm water; then, a pad of cotton-wool should be soaked in the following solution, placed between the hoofs, and kept in position with a bandage:—Bichloride of mercury, 1 dr.; water, 20 oz. After the disease has disappeared, the cleft of the foot should be filled with Stockholm tar, and the animal kept as dry and clean as possible.

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## THE STOMACH-WORM IN SHEEP.

[CONTINUED FROM JULY NUMBER.]

By W. G. BROWN, Sheep and Wool Expert, Department of Agriculture and Stock.

In last month's issue of this journal mention was made that Dr. Theiler, C.M.G., Director of Veterinary Research to the South African Government, had made a number of experiments with the object of finding a good vermicide.

The results of these experiments were given in the "South African Agricultural Journal" for October, 1912.

It is not proposed to give the whole set of tables, but only some of Dr. Theiler's conclusions on the results of his experiments.

The first part of the article gives the life-history of the wire (or stomach) worm on much the same lines as was given in this journal last month, so that it is not necessary to reproduce it. Dr. Theiler says (p. 574)—

"It must be stated that even the best medicine does not kill all the worms in the stomach of all sheep, and there are always some parasites which escape. Accordingly, a clean pasture will, in time, become reinfected, particularly in a moist warm season. It is here that the sheep farmer will be able to show his skill in handling his flock, so that during these periods the animals do not remain too long on the same pasture, but are systematically changed on to the clean veldt."

A method of testing whether worms are present in large numbers is given by the American scientist, Ransom, whom Dr. Theiler quotes: "We have been able to confirm the views expressed by Ransom that the mature young worms are able to crawl and to ascend perpendicular

surfaces, provided the atmosphere is saturated with moisture, which, of course, is frequently the case in a rainy season. Blades of grass, at the roots of which such young worms are placed, were found swarming with worms after remaining a few days in a saturated atmosphere under a glass bell. The young worms may also be seen with the naked eye crawling up the inner surface of a test tube, when some droppings containing eggs are placed in it. This is a convenient way of finding out whether a sheep is infected with worms, and to what degree this infection exists. The manure is placed in a wine-glass, covered so as to ensure a moist atmosphere in the glass, and within a few days white masses will appear along the walls of the glass. These masses consist of young wire-worms."

Dr. Theiler is a strong advocate of periodical burning. He says—

"One (of the methods) is the burning of grass. It has been stated above that the young worms crawl to the top of the grasses, from where they reach the stomach of their host. The South African farmers know the value of a 'brand' although they have not made a full use of that knowledge.

"Where no clean ground and no fresh brand is available, and sheep after dosing become reinfected, the repeated use of vermicides is the last resource. These vermicides reduce the numbers of worms in the stomach, and, although this treatment is the least satisfactory, it is nevertheless made the most use of. It ought to be supplemented by 'rotation of pasture' system, as indicated before, when the necessity of frequent dosing is reduced."

## THE MEDICINES.

"A number of experiments were undertaken by us to test the two common medicines used for dosing sheep—*i.e.*, bluestone and Cooper's dip. The former was first recommended by the late Dr. Hutcheon in liquid form, but as the drenching of sheep was followed frequently by accidents due to traumatic pneumonia, many farmers considered it too dangerous to be recommended. Cooper's dip, for a long time, has had the reputation of being a good remedy for wire-worms, although the safe dose which could be given to the various classes of sheep has never been worked out properly. Since a combination of the two had already been adopted by many farmers, and which was highly recommended, it was thought advisable to give it our attention and to ascertain, in a series of experiments, the safe maximal dose."

"The results of these experiments were published in the 'Union Agricultural Journal' for August, 1912, and may be shortly summarised here:—

"Maximal safe dose for sheep of 4-8 tooth, 15 grains Cooper's dip and 15 grains bluestone; maximal safe dose for sheep 2-tooth, 10 grains Cooper's dip and 10 grains bluestone; maximal safe dose for lambs from five months, 7½ grains Cooper's dip and 7½ grains bluestone. Experiments proved that smaller doses than the maximal safe dose were equally effective; and accordingly the doses recommended were as follow:—Sheep of 4-8 tooth, 10 grains Cooper's dip and 10 grains bluestone; sheep 2-tooth, 7 grains Cooper's dip and 7 grains bluestone; lambs, 6 to 9 months old, 5 grains Cooper's dip and 5 grains of bluestone. The effect of dosing with a mixture of Cooper's dip and bluestone was controlled in the experiments by counting the eggs passed by the sheep

before and after dosing; if the drug is effective it must kill off all the wire-worms and no more eggs will be produced."

Here follow tables, to which I must refer the reader. The net results appear to be:—

"The decisive effect of this experiment—(No. 1 Table) 15 grains Cooper's dip and 15 grains bluestone—on sheep is shown, but at the same time it can be seen that not all the worms were killed by even this maximal dose. No. 2 Table: 7½ grains Cooper's dip and 7½ grains bluestone. This table shows a decisive effect on the worms, but nevertheless eggs were still found in some of the dosed sheep on the seventh and tenth days."

"It may be stated here that we cannot expect to find a medicine which, given only once, would prevent a reinfection for any length of time. The effect of any drug will wear off, and this takes place after a comparatively short time. Accordingly, if the animals cannot be removed out of the infected pasture, recourse is taken to repeated dosing, and it is important to know at what intervals and how frequently this dosing can be undertaken without injury to the sheep. To settle these points further experiments were made, and the results appear below."

The tables are given, but for reasons of space must be omitted. The conclusions reached, however, are interesting. They are as follow:—

"The three control sheep which were not dosed gained, during the experiments, 3 lb. in weight; the examination of the droppings in the course of the experiments showed that they lost the worms without any treatment."

[TO BE CONTINUED.]

## PREVENTION OF FOOTROT IN SHEEP.

In reply to an inquiry as to the best means of preventing footrot in sheep in a wet climate such as the Cairns district, Mr. W. G. Brown, Instructor in Sheep and Wool, advises:—

The first necessity in wet seasons or on soft ground in the treatment of sheep is a stony ridge or sandy ground to which they may retire from the wet conditions of flats. In the absence of such there will always be trouble with the animal's feet. It is also necessary that the feet be inspected periodically and trimmed. A pair of clippers, such as are used by orchardists for trimming fruit trees (secateurs) is suitable for the work. Sheep on hard or sandy country do not suffer from long hoofs, because the feet are worn as fast as they grow. After trimming the feet, the bluestone treatment is the best I know of, and is used as follows:—

A race is made about 12 ft. long and about 1 ft. 9 in. wide. The floor of this race is made into a shallow trench, about 3 in. deep, and then filled with a solution of bluestone in the proportion of 1½ lb. of bluestone to 4 gallons of water. The sheep are then driven through. To prevent the sheep carrying a sore foot, as they are apt to do, stones should be placed in the trough, so that the animals stumble, and place all four feet down in the solution. When trimming the feet, examine the gland between the toes, and see that it is not blocked up with grass seeds or mud. This blocking is often a cause of lameness, and so-called footrot. The real footrot is contagious and infectious, and does not, as far as I know, exist in Queensland.

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF JUNE, 1915.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Noble Dot ... | Jersey ... ... | 2 May, 1915 | 630 | 4·6 | 34·14 | In addition to grazing on natural pastures, the cows received a daily ration of ensilage. |
| Iron Plate ... | ,, ... ... | 21 Feb. ,, | 443 | 5·4 | 28·31 | |
| Lady Athol | Shorthorn... ... | 29 May ,, | 748 | 3·2 | 27·91 | |
| Netherton Belle | Ayrshire ... ... | 23 April ,, | 564 | 4·2 | 27·83 | |
| Lady Twylish | Jersey ... ... | 5 June ,, | 496 | 4·7 | 27·47 | |
| Lady May ... | Ayrshire ... ... | 7 Mar. ,, | 605 | 3·6 | 25·51 | |
| Cocoatina ... | Jersey ... ... | 6 Mar. ,, | 377 | 4·9 | 21·78 | |
| Madame Melba | Holstein ... ... | 8 Sept., 1914 | 498 | 3·4 | 19·78 | |
| Thornton Fairetta | Jersey ... ... | 27 Mar., 1915 | 344 | 4·7 | 19·05 | |
| Nellie II. ... | Shorthorn... ... | 20 July, 1914 | 463 | 3·5 | 18·95 | |
| Lady Melba | Holstein ... ... | 6 Mar. ,, | 430 | 3·7 | 18·64 | |
| Miss Melba | ,, ... ... | 22 Nov. ,, | 492 | 3·2 | 18·35 | |
| Lady Loch II. | Ayrshire ... ... | 8 Feb., 1915 | 318 | 4·8 | 17·99 | |
| Nina ... | Shorthorn... ... | 18 Feb. ,, | 478 | 3·2 | 17·82 | |
| Bella ... | Ayrshire ... ... | 19 Jan. ,, | 434 | 3·5 | 17·76 | |

## ABERDEEN-ANGUS AS MILKERS.

BY P. R. GORDON.

Very little attention has been paid to the milking properties of the Aberdeen-Angus in Australia, and it is not very widely known in the Commonwealth that two of the breed won the championship at the London Dairy Show in 1892 and at the Dublin Dairy show in 1904, in addition to many subsidiary honours at these exhibitions. In the middle of last century the Aberdeen-Angus cattle were noted for their great milking properties throughout a great part of Scotland. Their chief claim lay in the richness of their milk. Youatt mentions that the polled cows of Buchan, small as they were, gave from 12 to 16 quarts, and sometimes even as much as 28 quarts. Several tribes are excellent milkers even to the present day—the most notable of which is the Fyvie Flower, and any of the strain, whether in pure or crossbred form, are eagerly purchased by the dairymen around Aberdeen. In fact their fame is equally great around Edinburgh, where the industry is practically one of cow feeding: That is, a cow enters the stall in full milk, and leaves it fat. The early breeders specialised to some extent in milking qualities—in fact, good milking properties were considered

absolutely necessary in the formation of the Keilor herd of Hugh Watson. A few years ago the Earl of Airlie, in a letter to the "North British Agriculturist," wrote: "I have at present seventeen pure Aberdeen-Angus cows in my dairy. The greater number of these give from 18 to 21 and sometimes 24 quarts a day for a considerable time after calving. The milk is admitted to be much richer than that of either the Shorthorn or the Ayrshire. As regards the length of time during which they will continue to give milk, my cow, Belle of Airlie (1959), as pure a polled animal as any in the herd book, used to be milked all the year round. Last year when I was from home, they left off milking her about a month before she calved and she died of milk fever, induced by the circumstance that she had not been relieved of her superabundant milk." At a later date he wrote: "When I wrote on the subject I had some cows that (newly calved) gave 21 quarts. I have now some cows that are giving as much as 18 quarts daily though quite three months calved." A friend of mine sent me some particulars of the Fyvie stud, where the milking reputation of the breed was well maintained until the dispersal of the stud. Charlotte of Fyvie was a marvellous type of a dual-purpose cow, and was equal to her 3½ lb. of butter per day, and her granddaughter won the second prize at the great Smithfield beef show. Duchess of Fyvie was also a great butter cow, and found her way into the stud of the Earl of Southwick, who also purchased two of the heavy milkers at 88 and 89 guineas at the sale. A cow of more than passing interest to Australia, bred at Fyvie, was Mary Grace, said to have been "as sweet a cow as ever was looked upon. She was the mother of Knight of Fyvie that came to Australia and was owned by the late Mr. David Syme, of Melbourne. Some of his progeny turned out exceedingly good milkers, and from Mr. Syme's catalogue we read of some of them giving as high as 20 quarts per day, although three months calved. Lizzie of Fyvie was a fine milker and went to Mr. Argo, of Cairdseat, and Fifty of Fyvie, also a good producer, was purchased by Sir William Forbes, of Craigievar. Annie Laurie, of the Fyvie Flower tribe, turned out a topnotcher in the dairy of Mr. Fraser, of Skilmafilly, and also bred many prize-winning stock. There can be little doubt that the Fyvie Flower and Pride of Aberdeen strains were from the indigenous stock of the Fyvie district, in addition to having an ancestor in the bull Angus, who was by Old Jock and out of Old Favourite, both bred by Hugh Watson. This further intensifies the belief that the Angus "Doddies" were a branch of the Aberdeenshire Buchan "Hummlies" that flourished in Fyvie and Buchan in pre-historic ages. How the one strain kept up its dual-purpose characteristics, as it does to the present day, while others went exclusively to beef, is just a matter of cultivation. But one thing is certain, the most exclusive "Pride" bull could never

shake the milking properties of the Fyvie Flowers, as example the Knight of Fyvie, a first cross of the two strains. The late Mr. James Smith, of Burnshangie, one of the oldest breeders of Aberdeen-Angus, wrote in regard to the old Buchan cows:—"The nearest approach to the best types of old Buchan cows that I can recollect is old Charlotte of Fyvie and Mr. Auld's 270-guinea cow, Pride of Aberdeen 9th." Now that dairying is assuming important dimensions in Scotland, and more especially in Aberdeenshire, it is not surprising to note that one of the first factories established in the country was at Fyvie. This shows the great local influence of the early labours of the breeders that is still being felt, although most of them have found a resting place in the green kirkyard on the banks of the Ythan, celebrated for its trout and pearls. The Aberdeen-Angus have much to commend them to Australia, as it is very doubtful if there is a breed of cattle on earth that serves a better dual purpose. The days of slaughter of the dairy calves are past, and beef will be beef for many years, and it is doubtful if a better all-round farmers' cow—a frugal, easily kept, rich butter cow—can be obtained than by crossing the Aberdeen-Angus on the Jersey, Shorthorn, or Ayrshire breed. We are verging into new circumstances, and these circumstances are similar to those of the dairymen around Glasgow, where the Aberdeen-Angus bull is extensively employed in Ayrshire dairy herds. The farmers are getting good male calves that fetch good prices—in fact, one year an Aberdeen-Angus-Ayrshire took second prize in the crossbred section of the Smithfield Show. And, from the prices that are being paid for the females of the composite dairy strain, it cannot even be hinted at that they are losing their milking qualities.

## FEEDING DAIRY COWS.

Dairy cows should be fed immediately after milking, particularly if the fodder should be of a character likely to convey any taint to the milk.

Relative to the mixing of molasses with green fodder, it is difficult to decide the influence molasses will have when mixed with the fodder unless the nature of the fodder is stated. However, it is to be said that molasses is generally used for the purpose of making the dryer fodders more appetising for the dairy cows, and, when used in this way, it is found that the dry fodders are more readily consumed by the animals.

## DESIGN FOR A CO-OPERATIVE BUTTER FACTORY.

In response to inquiries we have from time to time received, as to the most up-to-date butter factory buildings, Mr. A. Morry, surveyor, Department of Agriculture and Stock, has prepared the accompanying plans for a modern factory, having a capacity of an output of 5 tons weekly. These plans so clearly show the whole scheme, that any additional explanation is superfluous.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JUNE, 1915.

Five thousand one hundred and forty-seven eggs were laid during the month. Three of Mr. J. M. Manson's White Leghorns are now in moult. Since last report the pens owned by Messrs. C. E. Bertelsmeier and A. H. Padman have had a slight attack of warts, which has greatly affected their laying, especially in the case of the latter, two of whose birds appear to be breaking into moult. The weather has been very changeable—a few days very warm, followed by cold westerly winds lasting in one instance for ten days. This was very trying for the birds. R. Burns wins the monthly prize with 145 eggs. The following are the individual records:—

| Competitors. | Breed. | June. | Total. |
|---|---|---|---|
| Mrs. J. Jobling, N.S.W. | Black Orpingtons | 119 | 370 |
| Jas. McKay | White Leghorns | 132 | 363 |
| Mrs. Munro | Do. | 131 | 323 |
| J. D. Nicholson, N.S.W. | Do. | 110 | 318 |
| C. B. Bertelsmaier, S.A. | Do. | 93 | 310 |
| J. Gosley | Do. | 115 | 308 |
| A. W. Bailey | Do. | 110 | 296 |
| A. H. Padman, S.A. | Do. | 81 | 295 |
| S. E. Sharpe | Do. | 87 | 295 |
| J. R. Wilson | Do. | 108 | 293 |
| King and Watson, N.S.W. | Do. | 126 | 287 |
| Kelvin Poultry Farm | Do. | 123 | 280 |
| E. F. Dennis | Do. | 121 | 277 |
| C. F. Clark | Do. | 116 | 276 |
| A. T. Coomber | Do. | 102 | 273 |
| J. M. Manson | Black Orpingtons | 112 | 272 |
| T. Fanning | White Leghorns | 84 | 268 |
| E. V. Bennett, S.A. | Do. | 110 | 264 |
| R. Jobling, N.S.W. | S. L. Wyandottes | 104 | 260 |
| C. Knoblauch | White Leghorns | 95 | 258 |
| H. Harnill, N.S.W. | Do. | 99 | 253 |
| O.K. Poultry Yards | Do. | 92 | 252 |
| J. M. Manson | Do. | 86 | 248 |
| R. Jobling, N.S.W. | Do. | 103 | 248 |
| E. Le Breton | Do. | 123 | 242 |
| F. Clayton, N.S.W. | Do. | 94 | 239 |
| Cowan Bros., N.S.W. | Do. | 100 | 237 |
| R. Burns | Black Orpingtons | 145 | 231 |
| J. Aitcheson | White Leghorns | 123 | 231 |
| Geo. Tomlinson | Do. | 129 | 230 |
| W. Meneely | Black Orpingtons | 118 | 229 |
| T. Fanning | Do. | 119 | 227 |
| W. Lyell | White Leghorns | 86 | 219 |
| Moritz Bros., S.A. | Do. | 98 | 217 |
| E. A. Smith | Do. | 84 | 214 |
| W. Parker | Do. | 80 | 211 |
| Derrylin Poultry Farm | Do. | 84 | 211 |
| W. Purvis, S.A. | Do. | 79 | 211 |

| Competitors. | Breed. | June. | Total. |
|---|---|---|---|
| R. Burns ... ... ... ... ... | S. L. Wyandottes ... | 113 | 204 |
| J. Zahl ... ... ... ... ... | White Leghorns (No. 2) | 71 | 198 |
| Cowan Bros., N.S.W. ... ... ... | Black Orpingtons ... | 93 | 194 |
| G. H. Turner ... ... ... ... | White Leghorns ... | 93 | 186 |
| W. Lindus, N.S.W. ... ... ... | Do. ... ... | 103 | 174 |
| J. Zahl ... ... ... ... ... | Do. (No. 1) | 75 | 166 |
| J. G. Richter ... ... ... ... | Do. ... ... | 104 | 160 |
| Loloma Poultry Farm, N.S.W. ... | Rhode Island Reds ... | 80 | 153 |
| E. Pocock ... ... ... ... ... | White Leghorns ... | 64 | 147 |
| J. H. Gill, Victoria ... ... ... | Do. ... ... | 63 | 144 |
| E. A. Smith ... ... ... ... | Black Orpingtons ... | 92 | 132 |
| S. Chapman ... ... ... ... | Brown Leghorns ... | 86 | 110 |
| W. H. Forsyth, N.S.W. ... ... | White Leghorns ... | 27 | 65 |
| F. Clayton, N.S.W. ... ... ... | Rhode Island Reds ... | 62 | 63 |
| J. R. Johnston ... ... ... ... | Plymouth Rocks ... | 0 | 0 |
| Totals ... ... ... ... | ... | 5,147 | 12,132 |

## FEEDING OF POULTRY.

Mr. Hindes, Poultry Expert at the Queensland Agricultural College, replying to a question on the above subject, says: "With reference to the quantities of food given to fowls, as I pointed out in the report on the egg-laying competition, it is impossible to lay down any hard-and-fast rule. The feeder must find out for himself the amount of food the birds require at any one time, as they eat far more when laying heavily than they do when not laying, or when any portion of the flock is laying. To make it, if possible, plainer, we will suppose that a fowl requires, say, 3 oz. of food per day to keep it in good condition when not laying. The same hen commences to lay, say, four eggs a week, each egg weighing 2 oz. That means that the hen is producing 8 oz. of eggs per week, or over 1 oz. per day. She will, therefore, require over 1 oz. more food per day than when not laying. We feed the same all the year round, but in varying quantities according to the way the birds are laying.

## WORMS IN FOWLS.

The adult worms (*Heterakis*) are generally found in the alimentary canal of the fowl, but sometimes occur in the intestines. They develop direct from the eggs, which are eaten by the fowls (Theobald). If present in large numbers they may cause death. The birds should be kept without food for twenty hours, when the following dose should be given:—One grain of santonine and 7 grains of freshly-grown areca nut. Miss two or three days, and then repeat dose. This should complete the cure.

# The Horse.

## TREATMENT OF STRANGLES IN HORSES.

Horses affected by strangles should be kept dry and away from draughts. They should be rugged at night. Any swelling that appears should be well rubbed with the following embrocation:—Strong ammonia, 1 oz.; turpentine, 1 oz.; water, 2 oz.; olive oil, 6 oz. A plentiful supply of cold water should be allowed, into which 2 dr. chlorate of potash and 2 dr. nitrate of potash should be put, morning and night. Soft, nourishing food should be given, and it is advisable to place this on the ground, so as to favour any discharge from the head. If a discharge makes its appearance, the head should be steamed with hot bran for an hour twice daily.

## FOAL OUT OF CONDITION.

A nineteen months old foal, which, after being weaned, falls off in condition, but is otherwise in good health, should not be purged or bled. The best treatment to regulate the bowels and also to put condition on to the animal is to give it linseed jelly, which is made up as follows:—One teacupful of linseed should be placed in a billycan and just covered with warm water. This should be allowed to boil over a slow fire until the seeds have burst. One-half of the jelly should be mixed in a bran mash.

## REMOVING LAMPAS FROM HORSES.

The palate should be lanced between the first and second bars. Upon no account should the knife be inserted beyond the second bar, as there is a large artery there, which, if cut, will give a great deal of trouble before bleeding is stopped.

## CANARY SEED.

A heavy crop of canary grass will often yield over 3 tons of hay. The best month for sowing the seed is May, but it is possible to secure a catch crop by sowing as late as June, or even July; 15 lb. of seed will suffice per acre if drilled in. As for soil, excellent crops have been raised on the heavy brown, loamy soil at the Hermitage State Farm. The young crop may be grazed off by sheep provided they are not kept on it too long, particularly when late in the season.

# State Farms.

## NOTES FROM KAMERUNGA STATE NURSERY, CAIRNS, NORTH QUEENSLAND.

Mr. C. E. Wood, manager, reports as follows for the month of June:—

Rainfall for month, 1·99 in.; number of days on which rain fell, 9; rainfall from 1st January to 30th June, 19·84 in.; average rainfall for the same period, 1st January to 30th June, for the previous twenty-five years, 72 in. These figures will give some idea as to the dry conditions prevailing in this Northern district. I might also mention that the smallest rainfall for the above period during the twenty-five years was 38·12 in. in 1897 and 38·55 in. in 1902—practically double the rainfall so far experienced this year. Maximum temperature, 89; minimum temperature, 49. From the above figures it will easily be understood that many of our tropical crops, requiring as they do a good amount of rain, are either a complete or partial failure.

The effect on coffee, as noted here, has not been in reducing the number of cherries, as the setting of the fruit took place during October and November of last year, when conditions were favourable; but the fruit has undoubtedly ripened earlier, and the beans are small.

In bananas the effect has been not so much in reducing the number of hands, as bunches maturing now would have already been formed before they could be affected by the dry weather; but, excepting in very small bunches, the individual fruits or fingers have failed to swell to what would be their normal size, also the hands are closer together, thus giving the bunches a small and dumpy appearance as compared to what they would be under normal weather conditions.


## LIVING IN TENTS.

A certain percentage of our population lives always in tents—some of them good tents that keep out the water and weather—others very indifferent tents. The quality of a tent depends largely on the quality of the material used, but also on the quality of the workmanship. It isn't everybody who knows how to make a really satisfactory tent, but there are a few who do, and one of these is G. Smith, of 170 Edward street, Brisbane. His tents have been "Standard" for many years. He specialises in tents, tarpaulins, flags, and oilcoats, and it has always been his endeavour to supply the public with the best quality of goods obtainable. See advertisement in this issue.

# Horticulture.

## INCREASING ORNAMENTAL-LEAVED BEGONIAS.

Were the ornamental-leaved begonias more difficult of cultivation, probably they would receive greater attention and be more appreciated. The ease with which they may be cultivated, and the remarkable colourings of their large leaves, entitles them to greater prominence than both amateurs and professionals allot to them at present in South Africa. The markings of their leaves are unique in shape, and wonderful for the large range of colours even a single leaf may contain. All shades from the deepest velvety black crimson to the purest silver white are to be found; and nothing relieves the green of a fernhouse or stoep with more harmonious effect.

Perhaps one reason that they are not popular is that the "man in the street" does not understand how to create young plants to follow his old ones when they naturally, during the course of time, become untidy. With the object of showing how simple their reproduction really is, we are featuring this process in our Pictorial Hints this month. First of all let us state that this class of begonia must be grown in partial shade, exposure to direct sunshine having an unfavourable effect upon the foliage.

The plants are suitable for either borders, pot culture, or growing on rockwork, an open soil composed of 8 parts fibrous loam, 4 parts peat, 4 parts leaf-soil, 2 parts thoroughly decayed manure, and 1 part coarse sand being satisfactory. During the winter the roots of the

Fig. 1.

The underside of a Begonia leaf, the cross lines showing the proper positions in which to cut the notches in the principal veins before laying the leaf on the soil.

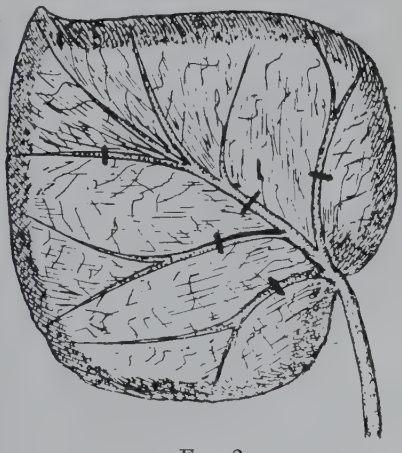


Fig. 2.

Another leaf of Begonia with the notches cut in the wrong positions, these being too far from the oints from which the secondary ribs branch out.

plants should be kept on the dry side; but during the growing period plenty of water at the roots is essential, together with occasional applications of well diluted liquid manure.

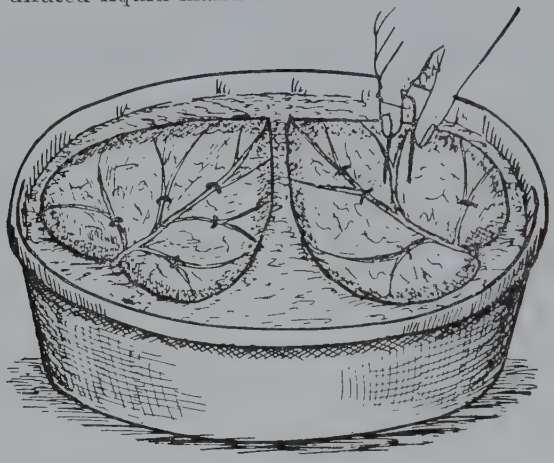


FIG. 3.

Two Begonia leaves cut as in Fig. 1 placed upon the pan of soil and held in close contact with the soil with small hairpins or layering pins.

## PROPAGATION BY LAYERING.

Although ornamental-leaved begonias can be increased by division of the plants, the most interesting method of propagation is by layering the leaves. Well-developed, sound leaves must be selected for this purpose, and after being removed from the plants turned underside upwards, so that cuts or notches can be made in the principal veins. The notches should be cut about half way through the veins at points where secondary veins branch out. A number of notches may, of course, be made in each leaf. At each cut the sap in the ribs will form a callus and foundation for the production and development of roots. A well-drained shallow pan of light sandy soil should be prepared, and after watering and allowing the soil to drain, the surface should be covered with a layer of sand. The prepared leaves should then be laid on the surface cut side downwards, whilst the leaf stem should be inserted in the soil; and to ensure the notches in the ribs coming in contact with the soil, hairpins or wire layering pins should be passed through the leaves near these points. Plunge the pan in cocoa fibre refuse in a propagating frame having a temperature of from 60 degrees to 70 degrees, shade from the sun, keep nicely moist but not wet, and after a time, if all is satisfactory, a tiny plantlet will be produced at each notch made in the veins of the leaves. As soon as the plantlets are large enough to handle they should be lifted and planted singly into small pots. The best time to increase foliage begonias by division is when the plants are repotted in the spring.

## VARIETIES.

Amongst the many varieties of ornamental-leaved begonias the following comprise some of the best:—Begonia Rex, deep green leaves of metallic hue, ornamented by a ring of silvery white; B. Louise Gloson,

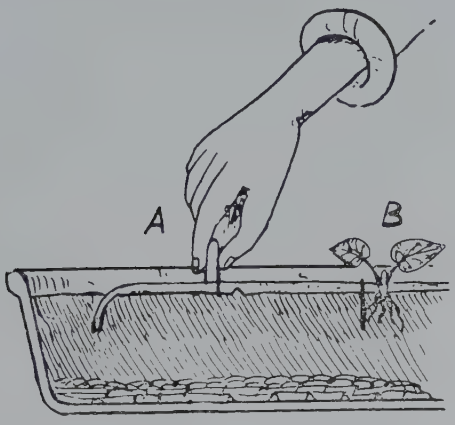
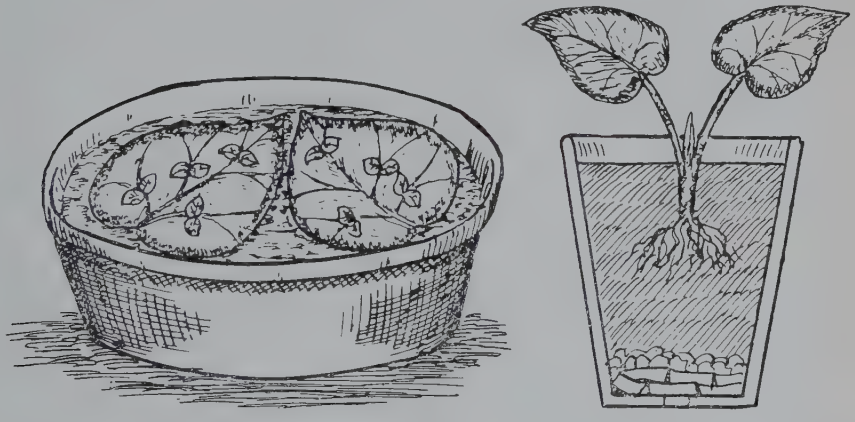



Fig. 4.

Shows the pan in section and the best position for pinning down the leaf, *i.e.*, over the rib a short distance from the notch. B shows the plantlet growing from the notch.

dark maroon foliage relieved by a crimson horse-shoe; B. Eudoxa, bronze leaves relieved by pink and white spots; B. Comtesse de Louise Erbody, silvery leaves margined with purple-lake and green veins; B. Prince



Figs. 5 and 6.

Fig. 5 portrays the result of our efforts, eight little plantlets growing from the leaves where they were cut, and Fig. 6 shows the plantlet removed from the leaf and properly potted into a small pot. Note that the head of the young plant only just protrudes from the soil.

Charles of Denmark, crimson leaves ornamented with a silvery horse-shoe; and B. President Carnot, silvery white variegated leaves.—"South African Gardening and Agriculture."

## MR. F. MANSON BAILEY, C.M.G.,

Late Colonial Botanist.

Last month it was learnt with profound regret that Mr. F. M. Bailey, Colonial Botanist, Queensland, had passed away at his residence at Kangaroo Point. The deceased scientist's illness was but a brief one, and only a few days prior to his death he was apparently in the best of health, and busied himself in his garden, despite the weight of his 88 years, up to the day of his death, when he became unwell and gradually lapsed into unconsciousness. He will be mourned by all, not alone for the loss which his death will inflict on the scientific world, though he leaves the nation a rich heritage in his compilations on botanical subjects, but because of his personal attributes.

The late Mr. Frederick Manson Bailey was lovable and kindly, and his life seemed to have been woven into the warp and woof of the fabric of Queensland. He leaves a gap that will be hard to fill. But his memory—the memory of a man who faithfully served his day and generation, and lived in charity with his neighbours—will be preserved green. Many a kindly remembrance of the old man will be called up from the galleries of the past. Frederick Manson Bailey first saw the light of day in London on 8th March, 1827. Hackney was the well-known old suburb in which his parents lived. His father, John Bailey, like his father before him, was a lover of nature, and studied it not merely for the sake of the living it yielded him, but because of an inherent love of plant life in its many forms. For many years in London the Bailey family conducted operations as nurserymen and seedsmen, and it was in the hope of making fresh conquests in the fields of botanic research, and of finding a larger and freer scope for his offspring, that John Bailey, in 1838, set sail for Australia with his family in the frigate "Buckinghamshire." She was the largest vessel that had ever sailed for the antipodes, her gross burthen being 1,500 tons. The vessel duly arrived in Southern waters, and on 22nd March, 1839, dropped anchor in Holdfast Bay, South Australia. John Bailey and his family set foot on the island continent full of hope as to the future. Colonel Gawler was then Governor of the Crown colony, and he nominated the new comer as Government Botanist. John Bailey accepted the position, and laid out the first botanical garden in the Southern capital. But times of stress came for South Australia, and Mr. Bailey resigned the position and established a nursery, Bailey's Gardens, as it was known, and the son Manson, now grown into manhood, took a hand in its management and control. But in the fifties there broke out the famous gold-rushes in Victoria, and young Manson Bailey, tempted by the fascinating lure of gold, threw up the garden spade to take up the miner's pick on Bendigo. Possibly he might have become a mining magnate had he not been recalled to Adelaide by the illness of his father. He resumed the old work for a time, but in 1858 resolved to go forth on a fresh quest. This time he made for New Zealand, where he took up land in the Hutt Valley, but was forced out of this fertile spot by the outbreak of the Maori war. So he set his feet towards Sydney, and after the briefest

acquaintance of New South Wales pushed on for Brisbane. He landed in the capital of Queensland in 1861, and established a seed business in a shop in Edward street, but there came a time of financial stress in the State, the shop was shut up, and the indomitable spirit of Frederick Manson Bailey had to look around for other avenues of living. Fate turned his steps in the direction of the position held by his father—that of Colonial Botanist. In 1875 a board was appointed by the Queensland Government to inquire into the causes of diseases affecting live stock and plants, and Mr. Bailey was appointed to deal with the botanical side of the problem. He took up the work with the enthusiasm and thoroughness typical of his nature, and pursuing his investigations far and wide throughout the State he contributed some valuable articles in regard to the native grasses of Queensland. He next was appointed to the charge of the botanical section of the Queensland Museum, and in 1881 was appointed to the proud position of Colonial Botanist of Queensland—a position he held and the duties of which he discharged with devotion and with benefit to the State up to the time of his death. During the years that followed his appointment as Colonial Botanist he travelled extensively throughout the State, and gained much valuable information regarding the flora of Queensland and its timber resources. The result of his researches was embodied in numerous volumes and papers, the most important of which is "The Flora of Queensland," an illustrated publication of seven volumes, dealing exhaustively with the vegetation of this fertile State. Mr. Bailey, who was recognised as a world's authority on botany, received the Clarke memorial medal, awarded by the Royal Society of New South Wales, in 1902, for researches in natural science, and fitting acknowledgment of his great services to Queensland came in 1911, when, his hair snow white with years, and his body bent by his labours, he was created C.M.G. by letters patent from the King. In reviewing a life so full of activity and so useful it may be pointed out that while paying attention to the systematic description of plants and their nomenclature he laid very great stress on their economic uses, and during the term of his official career he demonstrated the great value of native grasses, and emphasised the value of the timber resources of the State. He was a trained horticulturist, and his advice as a practical gardener, as well as a scientist, was always eagerly sought. He wrote interestingly regarding the garden plants and naturalised weeds. Another feature of his work was that he always kept his knowledge of the plant life of Queensland up to date. At one time he was indefatigable in travel in order to prosecute his research work, and in comparatively recent years he undertook a Northern tour and ascended the Bellenden Ker Range. In the official report dealing with the expedition he gave a full account of the plants of that region. He also studied plant life closely in the aspect of its medicinal value, and investigated the uses made of plants by the aborigines as food and for other purposes. As a scientific botanist he ranked high, and his information was always sought by botanists, Australian or foreign. He was not only in constant communication with the workers in this science, but prided himself on being a disciple of them—especially of the late George Bentham, the author

of the great work on Australian plants, "Flora Australiensis." Among his friends he numbered also Baron F. von Mueller, late Government Botanist of Victoria. As a worker he was tireless, and for years, after his official hours, was to be found at his desk in his own home pursuing the study of Australian plants. An illustration of his absorption in his work is found when, in the nineties, a period of retrenchment was ushered in, and Mr. Bailey's position as Colonial Botanist was abolished. Despite that fact he continued to attend his office and discharge his duties cheerfully, stating that the work must proceed whether he was paid for it or not; and there was such a protest from the public, who recognised the valuable work he was doing, that he was soon reinstated in his position with honour. By his sympathetic and genial disposition he made very close and intimate friends, and his character was such that whenever he made a friend he maintained that friendship throughout life. He had a fine memory and a splendid fund of anecdotes, his reminiscences of early life in South Australia being most interesting. He was very fond of flowers, of children, and of poetry, and his conversation was freely besprinkled with quotations from such authors as Pope, Gay, and Goldsmith. To the last he retained most of his faculties almost unimpaired, and was a fine example of an old English gentleman.

Of his writings the earliest, probably, was his "Handbook to the Ferns of Queensland," published in 1874; and among his numerous other publications were—"Synopsis of the Queensland Flora" (with three supplements), "Fern World of Australia," "Lithograms of Queensland Ferns," "Companion for Queensland Students of Plant Life," "Botany Abridged," "Notes for Guidance of Amateur Fruit Growers," "Catalogues of Plants in Brisbane Gardens," "Museum of Economic Botany," "Queensland Plants," "Queensland Woods," "Queensland Grasses," "A Sketch of the Economic Plants of Queensland," thirteen Botany Bulletins, and (in conjunction with Mr. P. R. Gordon, then Chief Inspector of Stock) "Plants Reputed Poisonous and Injurious to Stock." He also contributed monthly illustrated articles to the "Queensland Agricultural Journal," under the title of "Contributions to the Flora of Queensland and New Guinea." . . . He was a Fellow of the Linnaean Society. In 1856 he was married at Adelaide to Anna Maria, eldest daughter of the Rev. Thomas Waite, M.A., and his only son is Mr. John F. Bailey, the popular Director of the Botanic Gardens, who has inherited his father's taste for arboriculture.

We have taken the above notice of the late Mr. Bailey's life and work from the "Brisbane Courier." We may add that Mr. J. F. Bailey has now been appointed to succeed him as Colonial Botanist—a position he is in every way qualified to fill. His grandson, Mr. C. White, is also well advanced in botanical work, and as time goes on will doubtless follow in his footsteps.

# Chemistry.

## ANALYSES OF FERTILISERS.

By J. C. BRÜNNICH, Agricultural Chemist.

Since the introduction of "*The Fertilisers Act of* 1905" it has been found that in several instances difficulties arose in the administration of the Act and its regulations, and for this reason the Act was repealed and replaced by "*The Fertilisers Act of* 1914," which came into operation on the 1st day of January, 1915.

Samples of artificial fertilisers were again collected by the inspectors under the Act, but on account of the extreme shortage of potash fertilisers the stocks of mixed fertilisers are very low, and only a comparatively small amount of fertilisers could be obtained, the **analyses** of which are given in this report.

In accordance with the Act all **dealers,** which includes all persons who manufacture, import, indent, sell, deliver, forward, or deal in fertilisers, have to be **licensed,** and have to **register** the fertilisers they deal in. During this year sixty dealers have been licensed, and a complete list of these dealers and registered fertilisers will be given in a future issue of this Journal.

Upon the sale of any fertiliser the dealer must supply the buyer with an **invoice certificate,** signed by the dealer or his agent, stating the full name and place of business of the dealer; the name, trade mark, brand, or sign used to identify such fertiliser; quantity of fertiliser or net weight; the composition of fertiliser, setting forth the respective amounts of nitrogen, phosphoric acid, and potash, and the respective form in which they occur.

To each bag or package of fertiliser must be attached a **label,** certifying to the number of net pounds of fertiliser in the package, the figure, trade mark, or other sign under which fertiliser is sold, and the chemical analysis stating the proportion per centum of nitrogen, phosphoric acid, and potash, and the form in which they occur.

A slight variation in the composition of fertilisers, from the registered standard, is allowed under the Act and the **deficiency** of the amounts of nitrogen or potash must not be more than 5 per cent. or 1/20 of the total amounts of nitrogen or potash certified to be present, and in the case of phosphoric acid, 7 per cent. of the total amount of phosphoric acid.

The samples analysed agree fairly well with the registered composition, with the exception of one sample of imported superphosphate, which is much below standard.

The Act provides for the statement of the fertilising ingredients in per centum amounts of **nitrogen** (N), **potash** ($K_2O$), and **phosphoric acid** ($P_2O_5$), thus avoiding the confusion of terms previously used, like: Bone phosphate, ammonia, ammonium sulphate, potassium sulphate, &c.

**Phosphoric acid** appears under four different headings—**water soluble, citrate soluble, citrate insoluble,** and **total phosphoric acid.**

In bones, and in most of the mineral or rock phosphates, the phosphoric acid exists in combination with lime, in the form of a calcium phosphate—**tricalcic phosphate,** which is insoluble in water, partly soluble in citric acid solution (particularly bone phosphate), and easily soluble in mineral acids. On account of the insolubility the action of bone and mineral phosphates is very slow, and may extend over years. The finer the bones or phosphates are crushed or powdered the quicker will be the action, and for this reason the **fineness** of the bone-meals is of importance, and has to be stated.

When strong sulphuric acid is allowed to act on tricalcic phosphate (bone phosphate), part of the lime combined with the phosphoric acid is split off, lime sulphate or gypsum being formed and the phosphoric acid is left in form of **mono calcium phosphate,** the important ingredient of **superphosphates,** which is readily soluble in water, and therefore immediately available to plant life. In superphosphates, more particularly such made from mineral phosphates, a change of the water soluble form of phosphoric acid into a less soluble form, called reduced or reverted phosphate, takes place after storing. The same would happen if superphosphates are mixed with lime or ashes, and also when applied to soils containing large amounts of lime, and a **dicalcium phosphate** is formed which is insoluble in water, but soluble in citric acid solution. Another form of lime phosphate is found in basic slag or Thomas phosphate, a **tetra calcium phosphate,** which is also insoluble in water, but soluble in saline solutions, particularly such which contain salts of citric acid. These last two compounds are, therefore, classed as citrate soluble phosphoric acid, which is fairly readily absorbed by plant roots, and comes close in its value to the water soluble phosphoric acid.

Thomas phosphates must be ground as fine as possible, and a good sample should nearly all pass through a sieve having 100 meshes to a linear inch.

**Nitrogen** is the most expensive of all fertilising ingredients of a manure, and is chiefly supplied in form of **nitrate nitrogen,** as in Chili saltpetre and in nitrate of lime, or in form of **ammonia salts,** as in ammonium sulphate, a by-product of gasworks, or in form of **organic nitrogen** as in blood, green bones, meatworks manure, &c. Nitrogen in the form of nitrate is in quick acting and readily available form, but nitrates are not retained or absorbed by the soil, and therefore liable to be washed away by heavy rains. Nitrogen in form of ammonia salts and organic nitrogen is not so readily available, as it has to be changed first into nitrates by the process of nitrification going on in the soil. Favourable conditions and lime salts are necessary

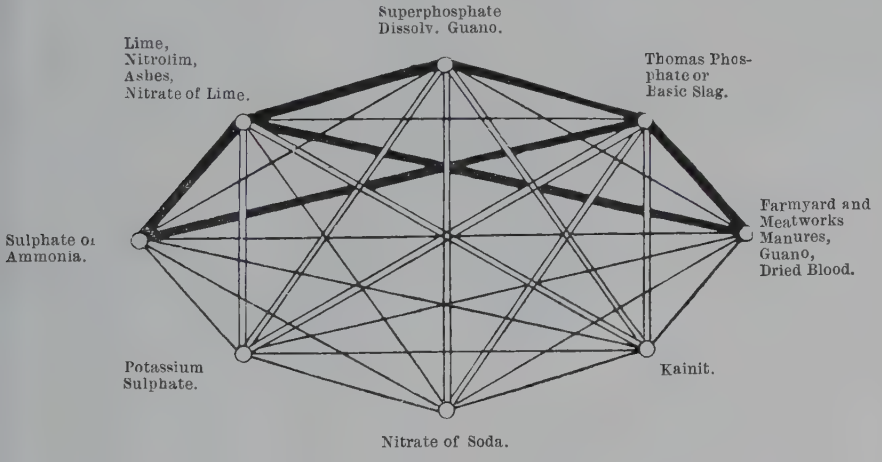
for this process, and in soils deficient in lime such manures may give poor or no results. Ammonium salts are retained and absorbed by the soil, and loss in the drainage water are not to be feared as is the case with nitrates. **Nitrolium** or **Cyananide,** an artificial fertiliser, actually produced from the nitrogen in the air, contains nitrogen in a form nearly as available as nitrate nitrogen.

**Potash** is generally used in the form of potassium sulphate, which at the present time cannot be obtained, as the only potash mines of commercial importance, worked so far, exist in Germany.

Attention is drawn to the analysis of ashes of various trees and plants, published at the end of fertiliser list, some of which contain fair amounts of potash, and may be utilised during the present shortage of potash fertilisers.

It is quite impossible to fix at the present day a monetary **manurial value per ton,** and therefore the usual unit values are omitted.

When **mixing fertilisers** together, such mixtures must be avoided which would lead to decomposition, which, for instance, would take place if ammonium sulphate was mixed with lime or with Thomas phosphates, superphosphate with lime; or which may cause caking, like mixing kainite with Thomas phosphate. A very simple guide for the mixing of manures is given in the accompanying diagram, devised by Dr. Geekens, which I slightly modified, however, to apply to our local conditions.




Manures joined by a *heavy black line* should *never be mixed* together; those connected by a *double line* must only be *mixed immediately before use;* and those joined by a *thin single line* may be safely *mixed* together *at any time.*

Any farmer in doubt about the quality of fertiliser purchased should at once apply to the nearest inspector under the Act, in order to let him draw a sample and submit same for analysis. All inspectors appointed under "*The Diseases in Stock Act,* 1896 *to* 1898," "*The Diseases in Plants Act of* 1896," or "*The Dairy Produce Acts,* 1904-1911," are officers under the Fertilisers Act.

## ANALYSES OF FERTILISERS.

| Lab. No. | Fertiliser. | Where Obtained. | Nitrogen N. | PHOSPHORIC ACID. | | | Potash, $K_2O$. | Lime, CaO. | Per Cent. of Crude Ash in Wood or Plant. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Water Soluble. | Citrate Soluble. | Total. | | | | |
| | | | % | % | % | % | % | % | % | |
| | | **Superphosphates.** | | | | | | | | |
| 1412 | Shirley's ... ... ... ... ... | Corser and Co. ... ... ... ... ... | ... | 16·10 | ... | ... | ... | ... | ... | |
| 1584 | Mount Lyell ... ... ... ... | Dalgety and Co., Brisbane ... ... ... | ... | 18·48 | ... | .. | ... | ... | ... | |
| 1583 | Shirley's ... ... ... ... ... | Paul and Gray ditto ... ... ... | ... | 16·98 | ... | ... | ... | ... | ... | |
| 1582 | Mount Lyell No. 1 ... ... ... | Charles Taylor ditto ... ... ... | ... | 19·05 | ... | .. | ... | ... | ... | |
| 1580 | Hassell's ... ... ... ... ... | Webster and Co. ditto ... ... ... | ... | 13·72 | ... | ... | ... | ... | ... | Under standard. |
| 1605 | Hassell's (2nd sample) ... ... ... | Ditto ditto ... ... ... | ... | 11·83 | ... | ... | ... | ... | ... | ,, ,, |
| 1581 | L. Gross and Sons ... ... ... | Ditto ditto ... ... ... | ... | 17·43 | ... | ... | ... | ... | ... | |
| | | **Bone, Meatworks Manure.** | | | | | | | | |
| 1586 | Fertiliser ... ... ... ... ... | Baynes Bros. ... ... ... ... ... | 4·98 | ... | ... | 18·40 | ... | ... | ... | |
| 1409 | Bone Dust ... ... ... ... ... | H. Baxter ... ... ... ... ... | 3·55 | ... | ... | 22·93 | ... | ... | ... | |
| 1576 | Bone Dust, "Runcorn" ... ... | Dalgety and Co. ... ... ... ... ... | 3·70 | ... | ... | 23·55 | ... | ... | ... | |
| 1432 | Bone Dust ... ... ... ... ... | J. W. Pohlman ... ... ... ... ... | 3·61 | ... | ... | 27·62 | ... | ... | ... | |
| 1350 | Bonemeal, "Wattle Brand" ... ... | Walsh and Co. ... ... ... ... ... | 3·22 | ... | ... | 26·40 | ... | ... | ... | |
| 1577 | Bonemeal ... ... ... ... ... | T. H. Wood ... ... ... ... ... | 4·14 | ... | ... | 23·40 | ... | ... | ... | |
| | | **Mixed Fertilisers.** | | | | | | | | |
| 1411 | Shirley's No. 3 ... ... ... | Corser and Co. ... ... ... ... ... | 3·42 | 14·21 | ... | ... | 1·93 | ... | ... | |
| 1413 | Ditto No. 5 ... ... ... | Ditto ... ... ... ... ... | 3·27 | 12·20 | ... | ... | 5·53 | ... | ... | |
| 1414 | Ditto No 9 ... ... ... | Ditto ... ... ... ... ... | 3·85 | 5·38 | ... | 5·49 | 3·77 | ... | ... | |
| 1415 | Ditto No. 11 ... ... ... | Ditto ... ... ... ... ... | ... | 9·85 | ... | 10·40 | 7·91 | ... | ... | |
| 1410 | Ditto No. 777 ... ... ... | Ditto ... ... ... ... ... | 7·20 | 6·52 | ... | 6·85 | 6·70 | ... | ... | |
| 1590 | Ditto No. OR ... ... .. | Paul and Gray, Brisbane ... ... ... | 2·24 | ... | 8·60 | 17·19 | 6·36 | ... | ... | |
| 1592 | Ditto No. 3 ... ... ... | Ditto ditto ... ... ... | 3·55 | 12·40 | ... | 12·90 | 1·79 | ... | ... | |
| 1591 | Ditto No. 14 ... ... ... | Ditto ditto ... ... ... | 2·41 | 5·01 | ... | 16·45 | 5·93 | ... | ... | |
| 1589 | Ditto No. 3 ... ... ... | Charles Taylor, Brisbane ... ... ... | 3·68 | 11·88 | ... | ... | 2·06 | ... | ... | |
| 1588 | Ditto No. 5 ... ... ... | Ditto ditto ... ... ... | 3·32 | 11·90 | ... | ... | 5·67 | ... | ... | |
| 1351 | Ditto No. 9 ... ... ... | Walsh and Co. ... ... ... ... ... | 4·09 | 4·89 | ... | 5·35 | 3·95 | ... | ... | |

## Simple Fertilisers.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1492 | Sulphate of Ammonia ... ... ... | Brisbane Gas Company ... ... ... ... | 20·98 | ... | ... | ... | ... | ... | ... | | |
| 1585 | Nitrolim ... ... ... .. ... | Trackson Bros., Brisbane ... ... ... | 19·12 | ... | ... | ... | ... | ... | ... | | |
| 1587 | Sulphate of Potash ... ... ... | Webster and Co. ditto ... ... ... | ... | ... | ... | ... | 52·50 | ... | ... | | |

## Wood and Plant Ashes.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Red Gum ... .. ... ... | ... | ... | ... | ... | ·38 | 4·17 | ... | ... | | | |
| Spotted Gum ... ... ... ... | ... | ... | ... | ... | ·10 | ·70 | ... | ... | | | |
| Bloodwood ... ... ... ... | ... | ... | ... | ... | ·27 | 5·25 | 8·47 | ... | | | |
| Ironbark ... ... ... ... | ... | ... | ... | ... | ·82 | 1·53 | ... | ... | | | |
| Blackbutt ... ... ... ... | ... | .. | ... | ... | ·04 | 2·02 | 7·27 | ... | | | |
| Boxwood ... ... ... ... | ... | ... | ... | ... | ·87 | 1·85 | ... | ... | | | |
| Belar ... ... ... ... ... | ... | ... | ... | ... | ·02 | 4·95 | 49·10 | ... | | | |
| Gidyea ... ... ... ... ... | ... | ... | .. | ... | ·90 | 1·10 | 48·70 | ... | | | |
| Brigalow .. ... ... ... | .. | ... | ... | ... | ... | ·89 | 54·40 | ... | | | |
| Bottle Tree ... ... ... ... | ... | ... | ... | ... | ·24 | 29·02 | 23·48 | ... | | | |
| Apple Tree ... ... ... ... | ... | ... | ... | ... | ·34 | 4·45 | 29·85 | ... | | | |
| Cedar ... .. ... ... ... | ... | ... | ... | ... | ·71 | ·71 | 48·50 | 1·00 | | | |
| Pine ... ... ... ... ... | Works Department ... ... ... ... | ... | ... | ... | ·89 | 9·97 | 38 05 | ·82 | | | |
| Oregon Pine ... ... ... ... | Ditto ... ... ... ... | ... | ... | ... | ·50 | 1 31 | 29·12 | ·77 | | | |
| Hardwood .. ... ... ... | Ditto ... ... ... ... | ... | ... | ... | ·60 | 1·90 | 29·33 | ·31 | | | |
| Nettlewood ... ... ... ... | Ditto ... ... ... ... | ... | ... | ... | 4·14 | 6·46 | 28·05 | 3·36 | | | |
| Blue Mangrove... ... ... ... | G. Matthews, Crow's Nest ... .. ... | ... | ... | ... | 2·52 | 2·14 | 16·72 | ... | | | |
| Black Mangrove ... ... ... | A. F. Cutlock, Sandgate ... ... ... | ... | ... | ... | ·56 | 1·34 | 35·88 | ... | | | |
| Mangrove (*Ceriops candoleana*) ... | E. Rauge, Cairns ... ... ... ... | ... | ... | ... | ·76 | 3·28 | 36·80 | ... | | | |
| Mangrove, twigs and leaves ... ... | Ditto ditto ... ... ... ... | ... | ... | ... | 2·12 | 4·42 | 12·30 | ... | | | |
| Stinking Roger ... ... ... | A. F. Cutlock, Sandgate ... ... ... | ... | ... | ... | 15·81 | 20·00 | 27·18 | 2·62 | | | |
| Lantana ... ... ... ... ... | G. Matthews, Crows Nest ... ... ... | ... | ... | ... | 3·57 | 13·96 | 16·95 | ... | | | |
| Lantana, twigs and leaves .. ... | ... | ... | ... | ... | 3·50 | 11·78 | 11·52 | ... | | | |
| Banana plant ... ... ... ... | A. J. Cutlock, Sandgate ... . . ... | ... | ... | ... | 1·48 | 36·64 | 21·32 | ... | | | |
| Sisal Hemp ... ... ... ... | ... | ... | ... | ... | 4·60 | 8 00 | 31 86 | ... | | | |
| Pineapple plant ... ... ... | ... | ... | ... | ... | 5·88 | 15·02 | 7·20 | ... | | | |
| Cane tops ... ... ... ... | ... | ... | ... | ... | 4·90 | 6·49 | 4·78 | ... | | | |
| Cane trash ... ... ... ... | ... | ... | ... | ... | 3·20 | 4·90 | 4·00 | ... | | | |
| Prickly-pear ... ... ... ... | Dr. J. White, Dulacca .. ... ... ... | ... | ... | ... | ·48 | 9·48 | 19·92 | ... | From 1·2 to 2·6 in green plant. | | |

# Entomology.

## REPORT OF MR. E. JARVIS

(Entomologist to the Bureau of Sugar Experiment Stations).

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. E. Jarvis, Entomologist to the Bureau:—

With reference to work of a technical nature recently instituted at Gordonvale laboratory, I wish to state that during the past nine months a number of pinned and mounted specimens of insect pests associated with sugar-cane have been collected in this district, comprising 1,056 specimens, representing 425 distinct species. Forty-nine of these are more or less injurious to cane and 34 beneficial, while the remainder comprise miscellaneous species either closely related to the foregoing or incidentally associated with them. The work of rearing and studying the metamorphosis of scarabæidæ affecting cane is being continued, and experiments have been commenced with a view of acquiring information respecting parasitism in this connection.

Referring to the question of useful insects—a matter not hitherto dealt with in these reports—I may mention that the larval form of an eminently predaceous beetle belonging to the family *Elateridæ* has been under continuous observation at the laboratory since November last. This elaterid is extremely voracious, attacking both adult and grub forms of our cane beetles. It occurs sparingly in volcanic and sandy soils around Gordonvale, and in general appearance is not unlike a very large but flattened "wire worm" with highly polished dark-yellowish-brown body and formidable sickle-shaped jaws.

A specimen collected on 6th November, 1914, killed and devoured no less than 126 large cane grubs and four grey-back beetles during a period of seven months, and is still (4th June) in the larval stage and as greedy as ever.

When first caught, it measured about 2¾ in. in length, so had doubtless previously accounted for numerous grubs, but growth has been slow during confinement, in spite of so liberal an allowance of food, and the larva is now 3½ in. long. Additional smaller specimens were collected on 16th November, 1914, and up to the present two of these have between them killed and consumed 206 cane-grubs and a few adult albohirta.

I was fortunate in observing one in the act of eating a cane-beetle that had been placed in its breeding cage. About one-third of the larva was literally buried out of sight in the body of its unfortunate victim, whose neck had been entirely severed to enable the elaterid to push its head through the thorax into the abdomen for the purpose of imbibing its succulent contents. The record of mortality mentioned above was attained by larvæ confined at close quarters with their prey, in cages holding 54 cubic inches of soil. Under normal conditions, however, they would be compelled to hunt for grubs by tunnelling through the ground and might at times have to traverse several feet before locating one; so that, normally, the percentage of grubs destroyed would necessarily be much lower than this, and would also vary in different districts according to the degree of infestation. In localities such as "Green Hills," where soil conditions are congenial and grubs frequently occur in excessive numbers, this predator should be perfectly at home and capable of doing great execution. Field observations have not yet been undertaken, so that I am unable to speak definitely regarding the possibilities of augmenting its sphere of usefulness by artificial means; but apart from economic considerations, consider that the breeding and ultimate identification of this interesting beetle will prove of scientific value.

Mr. R. Illidge, of Brisbane, an authority on the habits of our coleoptera and other insects, informed me that four species of arboreal *Elateridæ*, belonging to genus Alaus, are predatory on various large wood-boring beetles. He has frequently observed larvæ of *Alaus gigas* inhabiting tunnels of its host (*Batocera* sp.) and attacking grubs, pupæ, and even newly emerged imagines of this beetle.

I may mention, too, that a predaceous elaterid (*Pyrophorus luminosus* Ill.) destroys grubs of "May Beetles" (*Lachnosterna*) in the cane fields of Porto Rico.

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## COMBATING THE GRUB PEST AT CHILDERS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following interesting report from Mr. H. Epps, secretary of the Shire Council, at Childers, with reference to the grub pest:—

"Following on the failure of voluntary action in the endeavour to combat the ravages of the cane-grub, and consequent upon a poll taken to ascertain the views of the ratepayers on the matter, my Council undertook to levy a rate upon the whole of the cane-growing areas within Divisions Nos. 2 and 3, but excluding the Goodwood areas as being too remote and but little if any affected. Such rate was to be

utilised as a fund for the destruction of the pest either as a grub or beetle or in any other way calculated to attain the object sought, the fund to be administered on the recommendations of an advisory board representative of the several interests concerned, who had no executive powers outside those permitted by the Council from time to time.

"The fund raised by the way of rates was further augmented by endowment from the several mills to whom cane was supplied at the rate of 50 per cent. of the rates paid by the contractor to the particular mill, the total sum so raised being further endowed by the Department of Agriculture at the rate of a further 50 per cent.

"The procedure so far adopted for dealing with the pest is as follows:—

"*Receivers.*—Cane-growers were appointed in suitable districts whose duty it was to receive from collectors the grubs or bettles delivered, and after measuring and destroying same to hand to the collector a voucher entitling him to payment on the basis authorised by the board from time to time, on presentation at the office of the local authority on specified dates.

"The particulars as to the origin of the pests so collected have been duly recorded, and it is anticipated will in time lead to the compilation of sufficient data as to the incidence of this pest, and so have some value in the work of combating the pest in future years.

"One factor already appears to be conclusively established, and appears to indicate most clearly the permanent value attaching to systematic collection of the beetle of the pest. Early in 1896 a 'beetle board' was formed in the Isis, which operated only over an area to the south-east of Childers, and which paid for the collection of beetles only. Operations continued until about 1909, and then languished, ceasing altogether in 1910.

"Following on the compilation of data referred to above, it is now demonstrated that only a very small—indeed, almost negligible—quantity of grubs or beetles are being received from this area as against the numbers from areas not previously dealt with in this way. A further illustration of this arises in connection with a large estate in the district. I am advised that the picking of the grub from this property has never been carried out, but very large expenditures have been incurred in treating with various deterrents, notably carbon bisulphide, moth ball, &c., notwithstanding which the fields presented a very bad appearance, and within the last three months about £100 has been paid out for grubs collected from this property; practically as much as has been paid for pests over the whole of the Isis for the year. It is, of course, not safe to dogmatise on a matter of this sort, but the facts so far seem to emphasise the permanent value attaching to sustained effort along the lines hitherto pursued, pending the discovery of more efficacious methods. This is the more important from the fact that not the least of the difficulties encountered in dealing with the grub pest arise from the impossibility of demonstrating tangible results from the action taken."

# General Notes.

## A POSSIBLE QUEENSLAND INDUSTRY.

### EUCALYPTUS OIL.

Through the courtesy of the Curator of the Technological Museum, Sydney, the Department of Agriculture and Stock has received the following information on the extraction of eucalyptus oils:—

"The cost of a plant for extracting eucalyptus oil varies greatly according to the method adopted. A common plant much in use in New South Wales is to use two 400-gallon iron ships' tanks, the condensing being done in a long pipe laid in the bed of a creek. If sufficiently long, the condensation is perfect. Such a plant would cost about £25. If a boiler is used to supply steam, and larger digesters are employed, then the cost would be proportionately greater; in fact, a large plant might run into a considerable amount. This expenditure would only be warranted if the supply of the material were considerable.

"The wholesale value of the oil varies with its constituents, and many classes of oil are obtainable from the eucalypts. The common peppermint oil used for the separation of metallic sulphides is worth about 6d. per lb. at the stills. The eucalyptus oils (those rich in eucalyptol, and not containing phellandrene), and used for pharmaceutical purposes, are worth about 1s. per lb. at the still; the Geranyl acetate oils, 10s. to 12s. per lb.; and the other kinds at various prices. Since the war, the demand for eucalyptus oils has fallen off. There should be a great demand for certain kinds of eucalyptus oils, and this will eventually be the case. The profit is largely governed by the law of supply and demand. The cost of production is made up by cutting the leaves (an expensive item where labour is dear), carting to the still, fitting up the still, and leaves and firing.

"No particular skill is required to distil the oil, but it is necessary to know what material is obtainable from the species to be worked. Although it is now well known that each particular species yields an oil fairly constant in character, yet the products of species vary so much between themselves, and the yields of oil are so variable, that it is desirable to determine the species before work is done on it. The oils of about 160 species of eucalypts have been determined here, so that the data are somewhat complete, and any advice is willingly given here (Technological Museum, Sydney) to those who purpose embarking in the industry."

## TO MAKE SOAP.

1. Dissolve 2 lb. of caustic soda (98 per cent.) in about 7 pints of water. Heat to boiling point, and add 12 lb. fat and 3 lb. resin together. Keep boiling until dissolved.

2. The first advice is, not to try and make a caustic lye from ashes and lime, but get reliable caustic soda. Greenbank's 98 per cent. is the

right thing. Next, get a Beaume densometer to test the strength of the lye. Take 30 lb. of pure tallow, 10 lb. resin, and about 4½ lb. of caustic soda (98 per cent.); powder the resin finely, then melt the tallow, and while this is hot stir in the resin until it is melted and well mixed. Dissolve the caustic soda in about 3 gallons of water, making the lye to test 30 degrees Beaume. While the fat and resin are in a hot, melted condition, pour in the lye and keep the mixture stirred, and at a temperature of 180 degrees Fahr., or a little below boiling, for two hours, testing the soap from time to time on the tongue. If all trace of alkali (caustic) disappears, add more lye until the soap, when applied to the tongue, gives a slight biting sensation. If the alkali is too pronounced, add more tallow and stir well to insure perfect mixing. A good newly boiled soap should bite the tongue about as sharply as vinegar; but, as it is kept and matures, this, to a certain extent, passes away.

## TO MAKE BLACK PUDDING.

The pig's blood, when fresh caught, must be seasoned with salt and well stirred until quite cold, or it will congeal. Put a quart of grits or groats to soak in each quart of blood one night. Moisten the crumbs of a quartern loaf in rather more than 2 quarts of new milk made hot. Have ready the skins to be filled, perfectly clean. Chop finely a sprig of savory, one of thyme, and one of marjoram. Season with pepper, salt, a few cloves, some allspice, a mite of ginger, and a nutmeg grated. Mix with 3 lb. chopped suet, six eggs beaten and strained, the bread and milk being well beaten, and lastly the groats which were soaked in the blood. When all is well mixed and ready, cut into some dice-shaped pieces some hog's lard. As you fill the skins, drop this in, about every 2 in. Tie in links only half full, and boil them in a large kettle, occasionally pricking them with a fine skewer as they boil, or they will burst before being half-cooked. When boiled, lay them upon straw till cold, then hang them in bags in the kitchen. When wanted, scald them and put them before the fire in a Dutch oven. Some cooks boil the groats in the milk until swelled; then they add more milk when mixing. Leeks are sometimes very finely shredded and added to the other ingredients.

## PRICKLY-PEAR BUREAU.

A few years ago this department purchased a B. and H. pear-burner from the Pearsall Mercantile Company, Pearsall, Texas, U.S.A. There is no agent in Queensland for the burners in question, but they could then be landed in Brisbane at a cost of about £4 12s. The cost may, at the present, be somewhat increased. Gasoline for use in the burners is obtainable from the Vacuum Oil Company, Brisbane, at about 2s. 6d. per gallon, in drums containing 3⅓ gallons.

The gasoline is put into a small tank strongly made of brass and riveted. There is a cast brass head onto which all fittings are screwed. These tanks are tested to 100 lb. to the square inch, and have a small pump attached, like that on a Primus stove, for keeping the pressure

on the burner at about 15 lb. to the square inch. The tank is slung over the right shoulder of a man, lying under his left arm. There is a brass pipe, about 6 ft. long, connected with the tank on a double joint, on the end of which is the burner. In burning pear, the man brings the tank under his arm, takes the pipe in his right hand, and, working the pump, puts the pressure on the burner and lights it. He then moves about the pear, pressing the flame from the burner in and around the leaves of the pear. This he can do without coming in contact with the thorns himself. The tank is filled two-thirds full of gasoline.

The Pearsall Company states that, in the United States, a man provided fodder for 375 head of stock for ninety days with one burner.

The manager of the State Farm, Bungeworgarai, Roma, who used this burner, advises that it does the work claimed for it in an efficient manner when it is properly used. It is quicker and more effective than ordinary fire-scorching, and should prove of great value to persons desirous of feeding pigs on pear, or converting it into silage. He remarked, however, that the cattle would not eat the pear so treated.

## POTASH FROM MANGROVE TREES.

Mr. J. C. Brünnich, Agricultural Chemist, states that the best samples of mangrove ash (leaves and twigs) would be worth about £2 per ton, with commercial potash at £14 per ton, and that at the present time the value would be nearly treble.

## BANANA STALKS AS PIG FOOD.

The Agricultural Chemist states that if the stalks are chopped up into short lengths, and mixed with pollard, they will prove a useful pig feed. Some time ago, when staying at one of the orchards at Mapleton, Blackall Range, we noted that the horses were almost exclusively fed on chopped banana stems, and the animals were in splendid condition.

## TO DESTROY ALGÆ IN BORE WATER.

A measured quantity of Portland cement mixed with a sufficient quantity of boiled linseed oil, to the consistency of thick paint, applied with a brush upon the surface of the iron. The paint should be properly laid on in two even coats. Twenty-four hours should be allowed to intervene between the first and second coats.

## "FORD" CARS.

The advent of the petrol engine denotes a new era in the ramification of farm life. Hitherto farm work in all its branches was performed either by manual labour or horse traction. Now, however, the petrol engine has superseded this "old-time" method, and is used from ploughing down to cream separating; and the "one-time" cart has now given place to the motor lorry, whilst the family buggy has been put aside for the touring car. The "Ford" car, which is familiarly known throughout the world, is expressly suitable for farm use owing to its simplicity

of control, its abundance of power, and proved economy; whilst the extraordinarily low price is an added attraction, coupled with the fact that the "Ford" car is the only car that does not undergo an annual alteration, and consequently spare parts can be always obtained no matter how old the car might become. This to a country owner is a most important feature. As an indication of the manner in which "Ford" cars are being sold in Queensland, the Queensland Motor Agency, Limited, of Brisbane, who are agents for the "Ford," inform us that for the six months of the present year they have sold no less than 420 cars, which they claim to represent half of the total cars sold in Queensland.

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JUNE IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JUNE, 1915 AND 1914, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|
| | June. | No. of Years' Records. | June. 1915. | June. 1914. |
| *North Coast.* | In. | | In. | In. |
| Atherton ... ... | 1·94 | 13 | 0·61 | 1·68 |
| Cairns ... ... | 2·42 | 27 | 2·16 | 2·79 |
| Cardwell ... ... | 1·75 | 27 | 1·19 | 3·75 |
| Cooktown ... ... | 2·02 | 27 | 2·06 | 7·21 |
| Herberton ... ... | 1·02 | 27 | 0·66 | 2·13 |
| Ingham ... ... | 2·34 | 22 | 0·32 | 9·06 |
| Innisfail ... ... | 6·60 | 27 | 6·35 | 8·45 |
| Mossman ... ... | 3·46 | 5 | 0·60 | 3·50 |
| Townsville ... ... | 1·45 | 30 | 0·02 | 4·55 |
| *Central Coast.* | | | | |
| Ayr ... ... ... | 1·45 | 27 | Nil | 2·57 |
| Bowen ... ... | 1·76 | 27 | 0·20 | 4·75 |
| Charters Towers ... | 1·45 | 27 | Nil | 2·92 |
| Mackay ... ... | 2·57 | 27 | 0·56 | 9·17 |
| Proserpine ... ... | 3·81 | 11 | 1·50 | 12·55 |
| St. Lawrence ... | 2·33 | 27 | 0·11 | 7·09 |
| *South Coast.* | | | | |
| Biggenden ... ... | 1·91 | 14 | 0·47 | 2·86 |
| Bundaberg ... ... | 2·87 | 27 | 0·58 | 2·89 |
| Brisbane ... ... | 2·66 | 64 | 1·44 | 4·00 |
| Childers ... ... | 2·36 | 19 | 0·26 | 4·53 |
| Crohamhurst ... | 4·29 | 22 | 0·78 | 8·81 |
| Esk ... ... ... | 2·02 | 27 | 0·65 | 4·12 |
| Gayndah ... ... | 1·70 | 27 | 1·47 | 2·61 |
| Gympie ... ... | 2·37 | 27 | 0·29 | 5·58 |
| Glasshouse M'tains | 4·68 | 6 | 0·23 | 7·85 |
| Kilkivan ... ... | 1·90 | 27 | Nil | 3·53 |
| Maryborough ... | 2·87 | 27 | 0·82 | 6·44 |

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|
| | June. | No. of Years' Records. | June. 1915. | June. 1914. |
| *South Coast*—continued: | In. | | In. | In. |
| Nanango ... ... | 1·96 | 27 | 0·26 | 3·25 |
| Rockhampton ... | 2·08 | 27 | Nil | 5·33 |
| Woodford ... ... | 2·72 | 27 | 0·20 | 5·01 |
| Yandina ... ... | 3·89 | 21 | 0·34 | 9·33 |
| *Darling Downs.* | | | | |
| Dalby ... ... | 1·64 | 27 | 0·34 | 2·55 |
| Emu Vale ... ... | 1·32 | 17 | 0·42 | 1·66 |
| Jimbour ... ... | 1·49 | 24 | 0·27 | 2·03 |
| Miles ... ... | 1·94 | 27 | 0·22 | 2·91 |
| Stanthorpe ... | 1·92 | 27 | 0·91 | 2·03 |
| Toowoomba ... | 2·24 | 27 | 0·67 | 3·32 |
| Warwick ... ... | 1·69 | 27 | 0·67 | 2·15 |
| *Maranoa.* | | | | |
| Roma ... ... | 1·84 | 25 | 0·15 | 2·36 |
| *State Farms, &c.* | | | | |
| Gatton College ... | 1·53 | 14 | 0·05 | 3·01 |
| Gindie ... ... | 1·50 | 13 | Nil | 3·44 |
| Kamerunga Nurs'y | 2·85 | 23 | 1·99 | 2·80 |
| Kairi ... ... | 1·27 | 3 | 1·15 | 1·66 |
| Sugar Experiment Station, Mackay | 2·20 | 16 | 0·42 | 8·98 |
| Bungeworgorai ... | 1·71 | 3 | 0·03 | 2·38 |
| Warren ... ... | 2·68 | 3 | Nil | 1·54 |
| Hermitage ... | 2·01 | 7 | 0·40 | 2·34 |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for June this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

# Answers to Correspondents.

## FATTENING SHEEP.

J. W. Evans, Rosewood—

Question.—I was thinking of fattening some sheep. What is a fair price to pay?

Mr. W. G. Brown, Instructor in Sheep and Wool, replies:—

"1. The price, as a rule, is governed by conditions. At present many sheepowners in the West are very short of feed, and consequently their spare stock is on the market at any decent price they can secure. At present you may buy good wethers in store condition at from 6s. to 8s. off shears; 6d. to 7d. per month may be added for wool grown since shearing.

"2. How long will they take to fatten on lucerne? On lucerne sheep should fatten in from four to five weeks if the supply of feed is kept up to them.

"3. From six to seven sheep can be fattened per acre easily at this time of the year (May).

"4. I recommend crossbreds if you can get them, and buy with good fresh mouths. Merinos will fatten, but more slowly. My quotation above is for Merinos."

## COCHINEAL.

"Cochineal," Gayndah—

Cochineal is used for dyeing purposes, producing a beautiful scarlet colour. In medicine it is only employed to give a pleasant tint to other preparations. It is imported from Mexico, the West Indies (particularly Jamaica), the Canary Islands, the United States, and Guatemala. More than 1,500,000 lb. have been brought annually to Europe. Some idea may be formed of the vast number of these creatures from the fact that each pound is supposed to contain 70,000 insects. It is a mistake to suppose that the insect will live on any variety of prickly-pear. Its principal food is the nopal plant, *Opuntia coccinellifera*. There are two principal varieties—silver cochineal, which has a greyish-red colour, the furrows of the body covered with a white bloom or fine down; and black cochineal, which is of a dark reddish-brown, and destitute of bloom. The former is of the most value. The male insect is winged, but the female is wingless, and when fully grown is about the size of a barleycorn, weighing about one-tenth of a grain. It is the dried body of the female which forms the cochineal of commerce. The insects are gathered about three times a year, when they are carefully brushed from the cactus leaves into bags, and are then killed by immersion in hot water, or by exposure to sun, steam, or the heat of an oven, losing by this process about two-thirds of their weight. The dried insects have been known to keep undecayed for sixty and even a hundred

years. The average price used to be from 6s. to 9s. per lb. We cannot say what the present price is. Probably aniline dyes have largely replaced the insect product.

The cochineal insect has been brought to Queensland and sent to that part of the State where a species of cactus is found on which it thrives. Write to Dr. Jean White Hanify, Experiment Station, Dulacca, or to the Under Secretary, Department of Public Lands, for information.

## PRUNING CUSTARD APPLES.

"PRUNING," Cleveland—

Mr. C. Ross, F.R.H.S., Instructor in Fruit Culture, gives the following advice:—

"Nearly all trees of the custard apple family have a spreading or pendulous habit, and the lower branches will soon sweep the ground if allowed to do so. It is necessary that the superstructure of the tree be established on a fairly high stem—*i.e.*, the framework of the main limbs should start at a point not less than 3 ft. from the ground. The method of pruning found most satisfactory is as follows:—

"Lift the head of the tree by cutting away all the portions of the under branches within 12 in. or 18 in. of the ground. As the higher branches continue their downward tendency, this will be an annual operation. Be careful not to thin out the head of the tree too much, as the habit of growth provides for sufficient light and air; but, as the fruit is borne on the old wood, a modified system of long spur pruning is advisable. Side shoots, laterals, and some of the strong leaders may be shortened back to one-half or two-thirds of their length. It should be remembered that severe top pruning produces more wood and less fruit. Judicious pruning is always beneficial, but be more sparing with the knife on extra vigorous trees."

## DRIFT SAND IN WELL-SINKING.

A correspondent writes that, in sinking a well, a layer of fine sand to a depth of 7 ft. or 8 ft. was met with at a depth of 20 ft., making it very difficult to continue sinking. Mr. A. Morry, Departmental Surveyor, in reply, states:—

" What is undoubtedly required is an iron cylinder in two sections of about 4 ft. each long. These would, however, be difficult to handle owing to their great weight. Wood cylinders about 1½ in. thick could be made to answer the purpose if constructed of silky oak or some other hardwood, and well tarred before fixing in position. This would last a long time. The cylinders should fit well together, or sand will flow constantly into the interior. Any cooper would soon put them together. If a good water supply is obtained, it may be worth while putting a concrete lining from the bottom to a point above the sand drift, which would be a permanent job. In putting down the cylinders, care must be taken to keep them perpendicular, or they will collapse."

[A similar case occurred on a sugar plantation ("Ormeau," Pimpama) in 1869. A well was being sunk to obtain a supply of water for the mill. A stratum of fine drift mud, at a depth of 18 ft., prevented further sinking. An engineer who happed to be staying at the plantation advised the same course as the above. The cylinders were made of silky oak, the joints being treated with "chunam" (tar and ashes). Five years later the wooden casing, 2 in. thick, was in a perfectly sound condition.—Ed. " Q.A.J."]

## DRENCH FOR SHEEP.

" L.M.C.," Kia Ora, Baking Board—

In reply to a question as to the best drench for sheep with worms, Mr. W. G. Brown, Instructor in Sheep and Wool, advises:—

"The best drench I know is the arsenical, the composition of which is—2 oz. arsenic, 6 lb. Epsom salts, and 5 gallons of water. Take a 5-gallon oil-drum, and put about 2½ gallons of water in it, and place upon a fire. When the water is boiling add the arsenic and Epsom salts; boil them for three-quarters of an hour, stirring occasionally; then add water to the mixture to make 5 gallons. The drench is then fit for use.

" Dose.—2 oz. (fluid) for sheep over 18 months, 1½ oz. for sheep under 18 months, and 1 oz. for lambs up to 6 months.

"Young lambs sucking their mothers up to two months do not require drenching."

## A PLANT POISONOUS TO SHEEP.

J. E. Markey, Yandilla—

The plant forwarded by you, which you believe to be responsible for heavy mortality amongst your sheep, is stated by Mr. F. M. Bailey, Colonial Botanist, to belong to *Euphorbia Drummundi,* and is commonly looked upon in Queensland as poisonous to sheep. In Bailey and Gordon's book, " Plants Reputed Poisonous to Stock," appears the following:—

" This weed is unquestionably poisonous to sheep, but when in a dry state seems to be comparatively, if not entirely, inocuous. It has been observed when eaten by sheep in the early morning, before the heat of the sun has dried it up, it is almost certain to be fatal. It is seldom eaten to excess except by travelling sheep, and when grass is scarce."

## CITRUS TREES SUITABLE FOR THE BURNETT DISTRICT.

Mr. C. Ross, Instructor in Fruit Culture, in reply to a correspondent who proposes to establish a vineyard and citrus orchard on a frontage to the Burnett River, on the Gayndah Line, and asks for information as to the best variety of citrus fruits for bearing, packing, and export, recommends the following varieties:—

Orange: Navel, Jaffa, Valencia, and Mediterranean Sweet.

Mandarin: Beauty of Glen Retreat, Emperor, and Scarlet.

Lemons: Villa Franca, Lisbon, and Messina.

Any of the Brisbane nurserymen should be able to supply.

## COLLAR ROT OF CITRUS TREES.

F. GORE JONES, Mount Mee—

From your description, I believe your lemon trees are attacked by a disease called mal-de-goma, or collar rot. This may result from bad drainage, or a small borer may have set up the gumming. Clear away the soil and loose bark from the stem and upper roots. Carefully examine for borers, and probe any orifices with a wire, and stop with hard soap. Cut away decayed wood and gumming bark with a very sharp knife, and dab the wounds with coal tar or dilute carbolic acid. If the subsoil is clayey, it should be drained at once. Deep planting often causes the disease; also organic manures near the stem.

## OATS IN THE TOLGA DISTRICT.

In reply to a correspondent at Tolga, as to the advisability of planting oats at Tolga, Mr. Quodling, Agricultural Inspector, states that oats in that district are susceptible to rust, and if the season is at all favourable for raising a hay crop during the winter months, canary seed is to be preferred. The plant is unaffected by rust, and has proved invaluable as a hay crop in the Rockhampton district, at the Warren State Farm; 14 lb. of seed is sufficient for an acre of ground, if drilled. When broadcasted, use from 20 to 24 lb. of seed. Late April and May are seasonable periods to plant.

## PRICE OF WHEAT PER QUARTER.

"WHEAT-GROWER," Warwick—

The price of wheat in the home markets is generally given at per quarter. The same with oats and often with maize. Suppose oats (40 lb. per bushel) are quoted at 16s. per quarter. A quarter is 8 bushels. Divide by 8 and you have the price per bushel—2s. If you wish to reduce the price per quarter to price per ton, in the case of oats at 16s. per quarter, multiply the price by 7 and you have 112s. = £5 12s. per ton. Or, again, maize (60 lb. per bushel) at 17s. per quarter, multiply the price by 4·66 which gives £4 per ton. Or wheat at 62 lb. per bushel, multiply the price per quarter by 4·51—price per quarter, 60s.; per ton, 270s. = £13 10s.

## FEEDING COWS WITH WASTE ORANGES.

The utilisation of waste oranges for feeding milking cows has been proved, by experiments at the Roma State Farm, to be valueless. Waste citrus fruits were fed to some cows, and the effect was most pronounced, not only in the flavour of the milk, but in that of the cream and butter. The taint was so strong that all the products mentioned were almost unsuitable for human use. However, there is no reason why the oranges should not be used when feed is scarce. We have no analysis of oranges to show their value for food for stock in this way, but no doubt they will assist in maintaining the animals in a more satisfactory condition.

## PECAN NUTS AND GRAPES.

S. Rowe, Nagoorin, Gladstone—

"In reply to your inquiries," writes Mr. C. Ross, Instructor in Fruit Culture, "seeds of Pecan nuts can be had from Mr. Pentecost, Helidon. The varieties of grapes recommended are—Syrian, Royal Ascot, Snow's Muscat, Gros Colman, Black Hamburg, Wilder Goethe, Iona, and Chasselas; also a few Isabella, useful for jam."

## STARTING AN ORCHARD.

W. Russell, Cloncurry—

Mr. C. Ross, Instructor in Fruit Culture, advises beginning with worked trees. Seedlings are constitutionally hardier and grow to a larger size, but they do not become profitable for many years after named varieties. They are very serviceable, however, if planted as a breakwind on the outer rows of an orchard. For a large plantation it is advisable to plant such varieties as will succeed each other for marketing, rather than one variety to come in at once.

The following is a good selection:—Oranges: White Siletta, Babina, Jaffa, Joppa, and Late Valencia. Mandarins: Beauty of Glen Retreat, Emperor, and Scarlet.

## TREATING A FISTULA.

A correspondent writes that he has a horse with a fistula on the withers, giving off a mattery discharge from a deep hole on the top of it, and asks for a cure. Mr. McGowen, Government Veterinary Surgeon, advises as follows:—

"A case such as this requires an operation to be performed, which should only be done by a qualified veterinary surgeon; but, in the meantime, it would be advisable to inject into the sinuses from which the matter is discharging, morning and evening, the following solution by means of a glass syringe:—Bichloride of mercury, 1 dr.; water, 10 oz. A 1-oz. syringe, which contains one dose, should be used."

## COWS CHEWING BONES.

W. Kirk, Wetheron—

Mr. Kirk asks the cause of and remedy for his cattle dying, apparently owing to their going lame, after chewing bones, mostly in the shoulder. When examined after death, the bones appeared to be decayed in the joints. The matter was referred to a veterinary surgeon of the Stock Department, who says—

"The animals are suffering from a disease known as osteomalacia, or soft bone, caused by a deficiency of lime in the soil. I would advise Mr. Kirk to put his animals onto the lick recommended by this Department, which is as follows:—Bonemeal, 1 lb.; carbonate of iron, 4 oz.; gentian, 4 oz.; common salt, 8 oz.; fenugreek, 4 oz. Mix thoroughly, and give one tablespoonful to each animal three times daily in food. This mixture can be had from any wholesale chemist."

## ANALYSIS OF PRICKLY-PEAR.

Mr. J. C. Brünnich, Agricultural Chemist, gives the analysis of the prickly-pear as follows:—"100 lb. of prickly-pear (average quality) contains ½ of proteids, 5½ lb. of carbohydrates, 1 lb. of fibre, and $\frac{1}{10}$ lb. of fat (all digestible constituents). A cow should consume from 40 to 80 lb. of the prepared sliced pear daily, and will require some roughage like bush hay, or wheat straw, and some food rich in proteids, like oilcake or cotton-seed meal, in addition."

## MIXING ARSENIC AND CAUSTIC SODA.

A corespondent asks whether it is necessary to boil arsenic and caustic soda in order to dissolve it. A mixture of these ingredients showed a deposit next day, and he asks if this deposit is an adulterant or really arsenic.

Mr. J. C. Brünnich, Agricultural Chemist, to whom the question was referred, advises as follows:—"A mixture of arsenic and caustic soda does not require boiling. It is best to mix the dry arsenic and caustic soda intimately, and add water slowly. Any residue left is generally sand or other impurity. None of the commercial arsenic contains, as a rule, more than 90 to 94 per cent. of arsenious acid, which is a good purity for a commercial raw product."

## LE HUGUENOT AND CRETAN WHEATS.

These are both macaroni wheats, and, although the grain of each could be milled, the resulting flour would be dark and not suitable unless blended with a large percentage of flour made from bread wheats. Le Huguenot is a bald wheat which resembles "Bald Medeah." It is an excellent variety for growing in coastal situations for green feed, for silage crops, and for hay. If a satisfactory grain crop is obtained, such could be used for macaroni making, or as a feed for poultry and stock. This variety is a fair rust and smut resister.

Cretan is a bearded wheat, the grain of which can be used similarly to the above. It is also a good wheat for green feed and for silage purposes, but the presence of the "beard" makes it unsatisfactory as a hay crop. This variety possesses excellent rust-resisting qualities.

## SOLID GROUND WHEN EXCAVATED.

A correspondent asks: How many cubic yards of loose muck (placed in a bank) are produced from 1 cubic yard of solid ground, say, hard clay, picked or ploughed? The question was submitted to Mr. A. Morry, surveyor to this Department, who advises as follows:—

"Solid ground, such as hard clay, will increase in bulk when excavated, so that one cubic yard will then be equal to 1¾ cubic yards. Rock, when excavated, will double itself—that is, 1 yard cube will then be equal to 2 yards."

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JULY, 1915.

| Article. | | JULY. |
|---|---|---|
| | | Prices. |
| Bacon | lb. | 8½d. to 10½d. |
| Bran | ton | £10 10s. |
| Butter | cwt. | 215s. |
| Chaff, Mixed | ton | £10 10s. to £12 |
| Chaff, Oaten | ,, | £13 10s. |
| Chaff, Lucerne | ,, | £13 5s. |
| Chaff, Wheaten | ,, | £8 |
| Cheese | lb. | 1s. to 1s. 0¾d. |
| Flour | ton | £16 10s. |
| Hams | lb. | 1s. 1d. |
| Hay, Oaten (Victorian) | ton | £16 |
| Hay, Lucerne | ,, | £10 to £16 |
| Honey | lb. | 3½d. |
| Maize | bush. | 5s. 5d. |
| Oats | ,, | 6s. 6d. |
| Onions | ton | £10 to £10 5s. |
| Peanuts | lb. | 3½d. |
| Pollard | ton | £10 10s. |
| Potatoes | ,, | £13 to £13 5s. |
| Potatoes (Sweet) | cwt. | 4s. 9d. |
| Pumpkins | ton | £4 to £5 |
| Sugar-cane | ,, | 36s. |
| Eggs | doz. | 1s. 3d. to 1s. 6d. |
| Fowls | pair | 2s. 9d. to 4s. 6d. |
| Ducks, English | ,, | 3s. to 3s. 9d. |
| Ducks, Muscovy | ,, | 3s. to 4s. 3d. |
| Turkeys (Hens) | ,, | 7s. to 8s. |
| Turkeys (Gobblers) | ,, | 10s. to 15s. |
| Wheat | bush. | 8s. |
| **VEGETABLES.** | | |
| Cabbages, per dozen | | 2s. 6d. to 5s. 6d. |
| Cauliflowers, per dozen | | 8s. to 12s. |
| Beans, per sugar bag | | 6s. to 9s. |
| Beetroot, per dozen bunches | | 9d. to 1s. |
| Carrots, per dozen bunches | | 1s. to 1s. 6d. |
| Chocos, per quarter-case | | 1s. 6d. to 2s. 9d. |
| Cucumbers, per dozen | | ... |
| Custard Marrows, per dozen | | 2s. 6d. to 3s. |
| Vegetable Marrows, per dozen | | 2s. to 5s. |
| Lettuce, per dozen | | ... |
| Peas, per sugar bag | | 4s. to 6s. 6d. |
| Celery, per dozen bunches | | 10d. to 1s. 9d. |
| Sweet Potatoes, per cwt. | | 4s. to 4s. 9d. |
| Table Pumpkins, per cwt. | | 5s. to 5s. 7d. |
| Tomatoes, per quarter-case | | 3s. 6d. to 7s. |
| Turnips, per dozen bunches | | 10d. to 1s. 3d. |
| Rhubarb, per bundle | | 1s. to 1s. 6d. |

## SOUTHERN FRUIT MARKETS.

| Article. | JULY. Prices. |
|---|---|
| Bananas (Queensland), per case | 14s. to 18s. |
| Bananas (Fiji), per case | 20s. to 21s. |
| Bananas (G.M.), per case | 20s. to 21s. |
| Mandarins, per case | 3s. 6d. to 5s. 6d. |
| Oranges (Navel), per case | 5s. to 8s. |
| Oranges (Other), per case | 3s. to 5s. 6d. |
| Passion Fruit, per quarter-case | 2s. to 9s. |
| Lemons, per bushel case | 2s. 6d. to 6s. |
| Papaw Apples, per half-case | ... |
| Pineapples (Queens), per case | 6s. to 8s. |
| Pineapples (Ripleys), per case | 4s. 6d. to 7s. |
| Pineapples (Common), per case | 4s. 6d. to 7s. |
| Tomatoes, per quarter-case | 5s. to 8s. |
| Cucumbers, per case | 6s. to 8s. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | JULY. Prices. |
|---|---|
| Apples (Tasmanian), per case | 8s. to 10s. |
| Apples, Cooking, per case | 6s. to 7s. 6d. |
| Apricots, per quarter-case | ... |
| Bananas (Cavendish), per dozen | 1½d. to 3½d. |
| Bananas (Sugar), per dozen | 1d. to 3d. |
| Cape Gooseberries, per quarter-case | 9s. to 10s. 9d. |
| Cherries, per quarter-case | ... |
| Cocoanuts, per sack | 12s. to 15s. |
| Cumquats, per quarter-case | 2s. to 2s. 9d. |
| Custard Apples, per quarter-case | 4s. to 5s. 6d. |
| Granadillas, per bushel case | 3s. 6d. to 6s. |
| Lemons (Lisbon), per case | 3s. to 6s. |
| Limes (Choice), per quarter-case | ... |
| Mandarins, per half-case | 2s. 6d. to 7s. |
| Mangoes, per quarter-case | ... |
| Nectarines, per quarter-case | ... |
| Oranges (Navel), per case | 5s. 6d. to 6s. 6d. |
| Oranges (Seville), per cwt. | 9s. 6d. |
| Oranges (other), per cwt. | 2s. 6d. to 4s. 6d. |
| Papaw Apples, per quarter case | 9d. to 1s. |
| Papaw Apples (Prime), per quarter-case | 1s. to 3s. |
| Passion Fruit, per quarter-case | 3s. 6d. to 5s. |
| Peaches, per quarter-case | ... |
| Peanuts, per pound | 3d. to 3½d. |
| Pears (Victorian), per case | ... |
| Rosellas, per sugar bag | ... |
| Persimmons, per quarter-case | ... |
| Pineapples (Ripley), per dozen | 1s. 6d. to 1s. 9d. |
| Pineapples (Rough), per dozen | 9d. to 1s. 3d. |
| Pineapples (Smooth), per dozen | 1s. 6d. to 3s. |
| Strawberries, per tray | 2s. to 3s. |
| Strawberries, per dozen pint boxes | 8s. to 12s. |
| Tomatoes, per quarter-case | 2s. to 4s. |

## TOP PRICES, ENOGGERA YARDS, JUNE, 1915.

| Animal. | JUNE. Prices. |
|---|---|
| Bullocks ... ... ... ... ... ... ... | £13 5s. to £17 2s. 6d. |
| Bullocks (single) ... ... ... ... ... ... ... | £20 2s. 6d. |
| Cows ... ... ... ... ... ... | £12 2s. 6d. to £15 2s. 6d. |
| Merino Wethers ... ... ... ... ... ... | 34s. |
| Crossbred Wethers ... ... ... ... ... ... | 38s. 3d. |
| Merino Ewes ... ... ... ... ... ... ... | 30s. 6d. |
| Crossbred Ewes ... ... ... ... ... ... ... | 45s. 6d. |
| Lambs ... ... ... ... ... ... ... ... | 32s. |
| Pigs (Porkers) ... ... ... ... ... ... ... | 52s. |

## LONDON QUOTATIONS.

LONDON, 24th July.

Danish butter is quoted at 162s. to 166s. per cwt.

The market for frozen rabbits is firm. New South Wales blues, ex store, are quoted at 20s. to 21s. per crate.

Jute, August shipment from Calcutta, £24 to £24 15s. per ton.

Hemp, July-September shipment, £31 10s. per ton.

Rubber, fine hard Para, 2s. 6d. per lb.; plantation first latex crepe, 2s. 6d.; smoked sheet, 2s. 5½d.

The Liverpool quotation for middling American cotton, July-August shipment, is 5·08d. per lb.

Copra, South Sea, August-September shipment, £21 10s. per ton.

Raw linseed oil, spot pipes, £26 5s. per ton.

## NOTICE.

All communications in connection with the Journal, inquiries, &c., should be addressed to "The Editor" only. Letters addressed personally are liable to delay in reply.

No replies can be given to Anonymous letters. The writers are requested to sign their communications, not necessarily for publication.

# TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

COMPUTED BY D. EGLINTON, F.R.A.S.

| Date. | MAY. | | JUNE. | | JULY. | | AUGUST. | |
|---|---|---|---|---|---|---|---|---|
| | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·14 | 5·17 | 6·31 | 5·0 | 6·39 | 5·3 | 6·30 | 5·18 |
| 2 | 6·14 | 5·16 | 6·31 | 5·0 | 6·39 | 5 3 | 6·30 | 5·18 |
| 3 | 6·15 | 5·15 | 6·32 | 5·0 | 6·39 | 5·3 | 6·29 | 5·19 |
| 4 | 6·15 | 5·14 | 6·32 | 5·0 | 6·40 | 5·4 | 6·28 | 5 20 |
| 5 | 6·16 | 5·13 | 6·33 | 4·59 | 6·40 | 5·4 | 6·27 | 5·21 |
| 6 | 6·17 | 5·12 | 6·33 | 4·59 | 6·40 | 5 4 | 6·27 | 5·21 |
| 7 | 6·17 | 5·12 | 6·34 | 4 59 | 6·40 | 5·5 | 6·26 | 5·21 |
| 8 | 6·18 | 5·11 | 6·34 | 4·59 | 6·40 | 5·5 | 6 25 | 5·22 |
| 9 | 6·18 | 5·11 | 6·34 | 4·59 | 6·40 | 5·5 | 6 24 | 5·22 |
| 10 | 6·19 | 5·10 | 6·35 | 4·59 | 6·40 | 5·6 | 6·24 | 5·22 |
| 11 | 6·19 | 5·10 | 6·35 | 4·59 | 6·39 | 5·6 | 6·23 | 5·23 |
| 12 | 6·20 | 5·9 | 6·35 | 4·59 | 6·39 | 5·6 | 6·23 | 5·23 |
| 13 | 6·20 | 5·9 | 6·35 | 4·59 | 6·39 | 5·7 | 6·22 | 5·24 |
| 14 | 6·20 | 5·8 | 6·36 | 4·59 | 6·39 | 5·7 | 6·21 | 5·25 |
| 15 | 6·21 | 5·8 | 6 36 | 5·0 | 6·38 | 5·8 | 6·20 | 5·26 |
| 16 | 6·21 | 5·7 | 6·36 | 5·0 | 6·38 | 5·8 | 6·19 | 5·26 |
| 17 | 6·22 | 5·6 | 6·37 | 5·0 | 6·38 | 5·9 | 6·18 | 5·26 |
| 18 | 6·22 | 5·5 | 6·37 | 5·0 | 6·37 | 5·10 | 6·17 | 5·27 |
| 19 | 6·23 | 5·5 | 6·37 | 5 0 | 6·37 | 5·11 | 6·16 | 5·27 |
| 20 | 6·23 | 5·4 | 6·38 | 5·0 | 6·36 | 5·12 | 6·15 | 5·27 |
| 21 | 6·24 | 5·4 | 6·38 | 5·0 | 6·36 | 5·12 | 6·14 | 5·28 |
| 22 | 6·24 | 5·4 | 6·38 | 5·0 | 6·36 | 5·12 | 6·13 | 5·28 |
| 23 | 6·25 | 5·3 | 6·38 | 5 0 | 6·35 | 5·13 | 6·12 | 5·29 |
| 24 | 6·25 | 5·3 | 6·38 | 5·1 | 6·35 | 5·13 | 6·11 | 5·29 |
| 25 | 6·26 | 5·3 | 6·39 | 5·1 | 6·35 | 5·13 | 6·10 | 5·30 |
| 26 | 6·26 | 5·2 | 6·39 | 5·1 | 6·34 | 5·14 | 6·9 | 5 30 |
| 27 | 6·27 | 5·2 | 6·39 | 5·2 | 6·34 | 5 14 | 6 8 | 5·31 |
| 28 | 6·28 | 5·2 | 6·39 | 5·2 | 6·33 | 5·15 | 6·7 | 5·31 |
| 29 | 6·29 | 5·1 | 6·39 | 5 2 | 6·32 | 5·16 | 6·6 | 5·32 |
| 30 | 6·30 | 5·1 | 6·39 | 5·3 | 6·31 | 5·17 | 6·5 | 5·32 |
| 31 | 6·30 | 5·1 | ... | ... | 6·31 | 5·17 | 6·5 | 5·33 |

## PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

| | | | H. M. |
|---|---|---|---|
| 6 May | ☽ | Last Quarter | 3 22 p.m. |
| 14 „ | ● | New Moon | 1 31 „ |
| 22 „ | ☾ | First Quarter | 2 50 „ |
| 29 „ | ○ | Full Moon | 7 33 a.m. |

The moon will be at its brightest not only when full, but because it will this month be at its least distance from the earth at that time.

| | | | |
|---|---|---|---|
| 5 June | ☽ | Last Quarter | 2 32 a.m. |
| 13 „ | ● | New Moon | 4 57 „ |
| 21 „ | ☾ | First Quarter | 12 24 „ |
| 27 „ | ○ | Full Moon | 2 27 p.m. |

The moon will be at its greatest distance from the earth on 11th June at 10 a.m., and nearest on the 26th at midday.

| | | | |
|---|---|---|---|
| 4 July | ☽ | Last Quarter | 3 54 p.m. |
| 12 „ | ● | New Moon | 7 30 „ |
| 20 „ | ☾ | First Quarter | 7 9 a.m. |
| 26 „ | ○ | Full Moon | 10 11 p.m. |

The moon will be at its greatest distance from the earth on 8th July, about 9 p.m. and at its nearest on the 24th at 3·24 p.m.

| | | | |
|---|---|---|---|
| 3 Aug. | ☽ | Last Quarter | 7 27 a.m. |
| 11 „ | ● | New Moon | 8 52 „ |
| 18 „ | ☾ | First Quarter | 12 17 p.m. |
| 25 „ | ○ | Full Moon | 7 40 a.m. |

The moon will be at its greatest distance from the earth on 5th August at 36 minutes after 12, midday, and at its nearest on the 20th about midnight.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes, respectively, later than at Brisbane.

At Roma the times of sunrise and sunset during May, June, July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given for Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

[All the particulars given on this page were computed by D. Eglinton, F.R.A.S., and should not be reproduced in local newspapers without acknowledgment.]

# Farm and Garden Notes for September.

Field.—Spring has now arrived, and with it there will be the usual trouble with weeds, especially on carelessly prepared ground. Therefore, the cultivator and the horse and hand hoe must be kept vigorously at work to check the weed pests and save the growing crops as well as much future labour. Attend to earthing up any crop which may require it. There may possibly occur drying winds, dry weather, and even very late frosts, which have not been unknown in parts of this State even as late as September. Still, good showers may be looked for in October, and much useful work may be done during the present month which will go far to afford a fair prospect of a good return for labour. Plant out *Agave rigida*, var. Sisalana (sisal hemp plant), in rows 6 to 8 ft. apart, according to the richness of the soil. All dry places on the farm, too rocky or too poor for any ordinary crops, should be planted with this valuable aloe. Especially should limestone country be selected for the purpose. If the soil is very poor, and the plants very small, it is better to put the latter out into a nursery of good soil, about 1 ft. apart. Next year they will be good-sized plants. Keep down tall weeds in the plantation, and do not allow couch or buffalo grass to grow about the roots. Sisal will do no good if planted on low-lying wet land, or on a pure sandy soil. It thrives best where there is plenty of lime, potash, and phosphoric acid, all of which (except potash, unobtainable under present war conditions) can be cheaply supplied if wanting in the soil. Sisal requires so little labour from planting to maturity that it can be grown to good profit despite the high cost of white labour. Sow cotton—Sea Island near the coast, and Uplands generally. Caravonica succeeds best in North Queensland. Sow maize, sorghum, imphee, mazzagua, Indian cane, prairie grass. Rhodes grass and paspalum, panicum, tobacco, pumpkins, and melons. Sugar-cane planting should be vigorously carried on. Plant sweet potatoes, yams, peanuts, arrowroot, turmeric, chicory, ginger, and canaigre, the latter a tuber yielding a valuable tanning substance. Plant out coffee.

Kitchen Garden.—Now is the time when the kitchen garden will richly repay all the labour bestowed upon it, for it is the month for sowing many kinds of vegetables. If the soil is not naturally rich, make it so by a liberal application of stable manure and compost. Failing a sufficient supply of these, artificials may be used with good results. Dig or plough the ground deeply, and afterwards keep the surface in good tilth about the crops. Water early in the morning or late in the evening, and in the latter case, stir the soil early next day to prevent caking. Mulching with straw, leaves, or litter will be of great benefit as the season becomes hotter. It is a good thing to apply a little salt to newly dug beds. What the action of salt is, is not exactly known, but when it is applied as a top dressing it tends to check rank growth. A little is excellent for cabbages, and especially for asparagus, but too much renders the soil sterile, and causes hardpan to form. French or

kidney beans may now be sown in all parts of the State. The Lima bean delights in the hottest weather. Sow the dwarf kinds in drills 3 ft. apart and 18 in. between the plants, and the climbing sorts 6 ft. each way. Sow Guada bean, providing a trellis for it to climb on later. Sow cucumbers, melons, marrows, and squash at once. If they are troubled by the red beetle, spray with Paris green or London purple. In cool districts, peas and even some beetroot may be sown. Set out egg plants in rows 4 ft. apart. Plant out tomatoes 3½ ft. each way, and train them to a single stem, either on stakes, trellis, or wire netting. Plant out rosellas. Sow mustard and cress, spinach, lettuce, vegetable marrows, custard marrows, parsnips, carrots, chicory, eschalots, cabbage, radishes, kohl-rabi, &c. These will all prove satisfactory, provided the ground is well worked, kept clean, and that water, manure, and, where required, shade are provided.

FLOWER GARDEN.—Continue to plant bulbs as directed last month. Protect the plants as much as possible from cold westerly winds, which may still occur, notwithstanding the increasing temperature. Be careful that the bulbs do not come in contact with fresh manure. Keep a good lookout for slugs. Plant out chrysanthemums, palms, and all kinds of tropical and semi-tropical plants. If hot weather should ensue after planting, water and shade must be given. Sow dianthus, snapdragon, and coleus, seed or cuttings of the latter. Roses will now be in full bloom. Keep them free from aphis, and cut off all spent blooms. This latter work should be done in the case of all flowers. If you wish to save seeds, do not wait for the very last blooms, but allow some of the very best to go to seed. If you have any toads in the garden or bush-house, encourage them to take up their abode there. They are perfectly harmless, in spite of their ugliness, and they destroy an astonishing number of insects injurious to plants. Fill up all vacancies with herbaceous plants. Sow zinnia, gaillardia, amaranthus, cockscomb, balsam, sunflower, marigold, cosmos, summer chrysanthemum, coreopsis, portulaca, mesembryanthemum, calendula, &c.

# Orchard Notes for September.

## THE SOUTHERN COAST DISTRICTS.

The marketing of citrus fruits, in the later districts, of the late winter or early spring crop of pines and bananas, also of strawberries and Cape gooseberries, will continue to occupy the attention of fruit-growers. We can only repeat the advice we have so often given in these Notes respecting the marketing of all kinds of fruit—viz., to grade the fruit evenly, pack honestly, and display it to the best advantage if you want to get good returns.

September is a very important month to the fruit-grower, owing to the fact that it is usually a dry month, and that it is essential in all cases

to keep the land in a high state of tilth, so as to retain the moisture that is required by the various trees that are in blossom, thus securing a good set of fruit. Where irrigation is available, it is advisable to give the trees a good watering should the ground be dry, as this will induce a good growth and cause the fruit to set well. If an irrigation is given, it should be a thorough one, not a mere surface watering, and once the land is saturated the moisture must be retained in the soil by constant and systematic cultivation. If this is done, one good watering will usually be enough to carry the trees through in good condition to the thunderstorms that come later or even to the summer rains, if the soil is of a deep sandy loamy nature.

No weeds must be allowed in the orchard or vineyard at this time of the year, as they are robbing the trees and plants of both the water and plant food that are so essential to them at this period of their growth.

There is not much to be done in the way of fighting scale insects during the month, as they are more effectually dealt with later on; but where young trees are showing signs of distress, owing to the presence of scale insects, they should be treated, the gas method being the most efficacious.

Beetles and other leaf-eating insects often make their appearance during the month. The best remedy is to spray the trees or plants with one or other of the arsenical washes that are recommended by me in this journal. The vineyard will require considerable attention. Not only must it be kept well worked, but any vines that are subject to the attack of black spot must be sprayed from time to time with Bordeaux mixture. Disbudding must be carefully carried out, as this work is equally as important as the winter pruning, as it is the best means of controlling the future shape of the vine. A very common fault with vines grown in the coast districts is that the buds often remain dormant, only the terminal bud and possibly one other starting into growth, thus leaving a long bare space on the main rods, which is undesirable. When this takes place, pinch back those shoots that have started, and which are taking the whole of the sap, and force the sap into the dormant buds, thus starting them into growth. This will result in an even growth of wood all over the vine—not a huge cane in one part and either a stunted growth or dormant buds on the rest.

Every care should be taken during the month to prevent the fruit-fly from getting an early start. All infested oranges, loquats, kumquats, or other fruits should be gathered and destroyed, as the keeping in check of the early spring crop of flies, when there are only comparatively few to deal with, will materially lessen the subsequent crops. Land that is to be planted to pines or bananas should be got ready now, though the planting need not be done till October, November, or even later. Prepare the land thoroughly; don't scratch the surface to the depth of a few inches, but plough as deeply as you have good surface soil, and break up the subsoil as deeply as you can possibly get power to do it. You will find that the extra money expended will be a profitable investment, as it will pay every time.

## TROPICAL COAST DISTRICTS.

September is usually a very dry month, and fruit trees of all kinds suffer in consequence. The spring crop of citrus fruits should be harvested by the end of the month, as, if allowed to hang later, there is a great risk of loss by fly. The fruit should be well sweated; and, if carefully selected, well-graded, and well packed, it should carry well to, and fetch high prices in, the Southern States, as there are no oranges or mandarins grown in Australia that can excel the flavour of the best of the Bowen, Cardwell, Cairns, Port Douglas, or Cooktown fruit.

As soon as the fruit is gathered, the trees should be pruned and sprayed with the lime and sulphur wash, as this wash is not only a good insecticide, but it will keep down the growth of all lichens, mosses, &c., to which the trees are very subject.

Every care should be taken to keep down the crop of fruit-fly during the month. All infested fruit should be gathered and destroyed, particularly that in or adjacent to banana plantations. Watch the banana gardens carefully, and keep well cultivated. New land should be got ready for planting, and where land is ready planting can take place.

Papaws and granadillas are in good condition now, and, if carefully gathered and well packed in cases only holding one layer of fruit, they should carry well to the Southern markets if sent in the cool chamber.

## SOUTHERN AND CENTRAL TABLELANDS.

Prune grape vines at Stanthorpe in the early part of the month, leaving the pruning as late as possible, as the object is to keep the vines back in order to escape damage from late spring frosts. All vines subject to the attack of black spot should be treated with the winter dressing when the buds are swelling; this treatment to be followed by spraying with Bordeaux mixture later on.

Where fruit trees have not received their winter spraying, they should be treated at once before they come out into flower or young growth. Where the orchard or vineyard has not been ploughed, do so, taking care to work the land down fine as soon as it is ploughed, so as to keep the moisture in the soil, as the spring is always the trying time for fruit trees.

Look out for fruit-fly in the late oranges and loquats in the Toowoomba district. Keep the orchards and vineyards well cultivated; disbud the vines when sufficiently advanced. Spray for codlin moth.

In the Central tablelands irrigate vines and fruit trees, and follow the irrigation with deep, constant, and systematic cultivation. Keep down all weed growth, and fight the red scale on citrus trees with cyanide. The objective of the fruit-growers throughout Queensland during September and the following months is, "How best to keep the moisture in the soil that is required by the trees, vines, plants, and vegetables"; and this objective can only be obtained by irrigation where same is available, or by deep, systematic, and constant cultivation where there is no water available for irrigation.

# LIST OF AGRICULTURAL, HORTICULTURAL, AND PASTORAL SOCIETIES AND ASSOCIATIONS IN QUEENSLAND.

Societies and associations desirous of being registered and placed on the above list must make application to that effect, and forward to the Under Secretary for Agriculture and Stock the following particulars:—

Number of members who have paid their subscriptions for 1912.

Number of meetings held by the Society during 1912.

Date of the last meeting.

Name of the Secretary for 1913.

It is equally necessary that prompt notice be given to the Editor of changes in the Secretaryship of any Society or Association, a matter which is much neglected. Furthermore, information concerning dates on which shows are to be held must be forwarded to the Editor at least six weeks before the Show date. If these suggestions are not complied with, the Society whose Secretary neglects to supply the required information will be liable to be struck off the list of Societies published monthly in the Journal.

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914 | 1915. |
| Allora | Central Downs Agricultural and Horticultural Association | J. C. Marshall ... | 17 and 18 Feb. | 17 and 18 Feb. |
| Aloomba, *viâ* Cairns | Aloomba Farmers' Association ... | Hugh A. Niven ... | | |
| Amberley ... | Amberley Farmers' Progress Association | J. T. Goldsborough | | |
| Atherton ... | Atherton Agricultural, Pastoral, and Industrial Association | H. McKnight ... | | |
| Atherton ... | Atherton Table Land Agricultural Society | H. McKnight ... | ... | 22 and 23 Sept. |
| Ayr ... .. | Lower Burdekin Farmers' Association | R. W. Edwards ... | | |
| Ayr ... ... | Lower Burdekin Pastoral, Agricultural, and Industrial Association | C. G. M. Boyce ... | 11 and 12 June | |
| Bajool ... | Bajool and Ulam Farmers' Progress Association | A. T. Mitchell ... | | |
| Ban Ban, *viâ* Byrnestown | Dundar Branch of the Queensland Farmers' Union | Geo. Gwynne ... | | |
| Barcaldine ... | Barcaldine Pastoral Agricultural and Horticultural Association | W. J. P. Chambers | | |
| Beaudesert . | Logan and Albert Agricultural and Pastoral Society | M. Selwyn Smith | 12 and 13 May | 11 and 12 May |
| Beenleigh ... | Agricultural and Pastoral Society of Southern Queensland | Capt. C. G. Gehrmann | 3 and 4 Sept. | 23 and 24 Sept. |
| Beenleigh ... | Logan Farmers' and Industrial Association | Wm. G. Winnett ... | | |
| Beerwah ... | Coochin Creek District Agricultural and Progress Association | E. F. Jones ... | | |
| Belli ... | Belli Creek Farmers' Progress Association | W. E. Neumann ... | | |
| Berwen ... | Haughton River Farmers' Association | James Griffith ... | | |
| Biggenden ... | Biggenden Agricultural and Pastoral Society | C. J. Stephensen ... | 9 and 10 July | 22 and 23 June |
| Bin Bin, *viâ* Gooroolba | Bin Bin Farmers and Settlers' Association | Milo Burke ... | | |
| Blackall ... | Barcoo Pastoral Society ... ... | C. M. Pegler ... | | |
| Blenheim ... | Blenheim and District and Farmers' Progress Association | W. A. Zerner ... | | |
| Blythedale ... | Blythedale Agricultural Progress Association | J. L. Quinn ... | | |
| Boonah ... | Fassifern and Dugandan Agricultural and Pastoral Association | J. McKenzie ... | 20 and 21 May | 19, 20, and 21 May |
| Boowoogum... | Brooyar Farmers' Progress Association | Jas. Cahill ... | | |
| Bowen ... | Bowen Farmers' Association... ... | H. Reye ... ... | | |
| Bowen ... | Bowen Pastoral, Agricultural and Mining Association | F. Sellars ... ... | 22, 23, and 24 July | |

## AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914. | 1915 |
| Brisbane ... | The Queensland Dairy Herd Book Society | Alfred Gorrie ... | | |
| Brisbane ... | National Agricultural and Industrial Association of Queensland | J. Bain ... ... | 10 to 15 Aug. | 9 to 14 Aug. |
| Brisbane ... | Queensland Chamber of Agricultural Societies | J. Bain ... ... | | |
| Brisbane .. | Horticultural Society of Queensland | F. W. Woodroffe ... | | |
| Bucca, *viâ* Bundaberg | United Farmers' Association ... | J. H. Hendy ... | | |
| Buderim Mountain | Buderim Branch of the Queensland Farmers' Union | Capt. G. Burrows .. | | |
| Bundaberg ... | Bundaberg Agricultural, Pastoral, and Industrial Society | Redmond Bros. ... | 3 and 4 Sept. | 9 and 10 Sept. |
| Bundaberg ... | Canegrowers' Union of Australia (Woongarra Branch) | O. H. Klotz ... | | |
| Bundaberg ... | Woongarra Canegrowers' Association (A.S.P.A. Branch) | G. O. Strathdee ... | | |
| Bunerba, Deeford (*viâ* Westwood) | Bunerba Farmers' Progress Association | H. J. Barnes ... | | |
| *Burrum ... | Burrum District Farmers' and Fruitgrowers' Association | S. E. Tooth ... | | |
| Byrnestown... | Byrnestown Farmers and Dairymen's Progress Association | Geo. H. Bomford ... | | |
| Caboolture ... | Caboolture Pastoral, Agricultural, and Industrial Society | C. V. Hemming ... | 1 May | 29 and 30 April |
| Cairns ... | Cairns Agricultural, Pastoral, and Mining Association | H. McMahon .. | | |
| Cairns ... | Cairns Horticultural Society .. | R. Tweedie ... | | |
| Cedar Pocket, Gympie | Cedar Pocket Farmers' Association... | W. A. Fraser ... | | |
| Charleville ... | Central Warrego Pastoral and Agricultural Association | T. C. Fallis ... | 4 and 5 May | |
| Charters Towers | Charters Towers Pastoral, Agricultural, and Mining Association | A. H. Pritchard ... | 1 and 2 July | 6 to 8 July |
| Charters Towers | The Towers Horticultural Society ... | Jas. H. Chappel ... | 19 and 20 August | 25 and 26 August |
| Chatsworth... | Chatsworth Combined Farmers' Association | F. W. Johns ... | | |
| Chatsworth... | Chatsworth Farmers' Progress Association | W. Allen ... ... | | |
| Childers ... | Childers Pastoral, Agricultural, and Industrial Society | J. R. Wrench .. | 18 and 19 June | 10 and 11 June |
| Childers ... | Doolbi Canegrowers' Association ... | R. S. Rankin | | |
| Chinchilla ... | Canaga Farmers' Progress Association | G. H. Rochester | | |
| Chinchilla ... | Pelican Farmers and Settlers' Association | H. K. Nevell ... | | |
| Chinchilla ... | Chinchilla Agricultural and Pastoral Association | B. Mackie ... ... | 14 and 15 April | 6 and 7 April |
| Clermont ... | Peak Downs Pastoral, Agricultural, and Horticultural Society | A. S. Narracott .. | 23 and 24 June | |
| Clifton .. | Darling Downs Pastoral, Agricultural, and Industrial Association | S. C. Mott ... ... | 30 Sept. and 1 Oct. | 22 and 23 Sept. |
| Coochin ... | Coochin Farmers' Progress Association | W. Watson .. | | |
| Cooktown ... | Cooktown District Pastoral, Agricultural, Mining, and Industrial Association | E. A. S. Olive ... | 1 and 2 July | |
| Cooroy ... | Cooroy West Farmers' Progress Association | O. M. Proll ... | | |
| Cooroy ... | Mount Cooroy Progress and Farmers' Association | L. H. Baldwin ... | | |
| Coulsen ... | Coulsen Farmers' Progress Association | Gustav A. Lewald | | |
| Coulstoun, *viâ* Biggenden | Coulston Lakes Branch of the Queensland Farmers' Union | P. E. Britnell ... | | |
| Crow's Nest | Crow's Nest Agricultural, Horticultural, and Industrial Society | James Gleeson ... | 28 and 29 April | 6 and 7 April |
| Dalby ... | Northern Downs Pastoral and Agricultural Association | W. R. Hunter ... | 26 and 27 May | 21 and 22 April |

* Monthly meetings held alternately at Burrum and Howard.

## AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914. | 1915. |
| Dallarnil ... | Dallarnil Farmers and Dairymen's Association | H. J. Piper ... | | |
| Didcot ... | Didcot Farmers and Settlers' Association | Fred. Jones ... | | |
| Deeford, (Dawson Valley) | Dundee Farmers and Settlers' Progress Association | C. G. Young ... | | |
| Degilbo ... | Emu Creek Farmers and Dairymen's Progress Association | J. E. Peterson ... | | |
| Dirran, *viâ* Malanda | Dirran Settlers' Progress Association | Percy G. R. Dutton | | |
| Emerald ... | Emerald Pastoral and Agricultural Society | J. Esmond ... ... | ... | 26 and 27 May |
| Esk ... ... | Esk and Toogoolawah Pastoral, Agricultural, and Industrial Association | Thos. C. Pryde ... | 5 and 6 May (at Toogoolawah) | 8 and 9 June |
| Eukey, *viâ* Ballandean | Eukey Farmers and Fruit-growers' Association | H. H. Stanton ... | | |
| Evelyn ... | Millstream Farmers and Settlers' Association | H. R. Gardiner ... | | |
| Fairford ... | Fairford Agricultural and Pastoral Association | H. E. Hollins ... | | |
| Fordsdale, *viâ* Grantham | Fordsdale Farmers' Association ... | W. M. Ridley ... | | |
| Forest Hill ... | Forest Hill Agricultural and Progress Association | J. Stoddart ... | | |
| Gayndah ... | Pastoral, Industrial, Agricultural, and Horticultural Association | M. C. Stephensen... | 9 and 10 June | 22 and 23 June |
| Gayndah ... | Gleneden Branch of the Queensland Farmers' Union | W. S. Morris ... | | |
| Gayndah ... | Gurgeena Farmers' Progress Association | W. G. Leaver ... | | |
| Gayndah ... | Binjour Farmers' Progressive Association | F. G. Hunter ... | | |
| Gin Gin ... | Currajong and Gin Gin Agricultural, Pastoral, and Industrial Society | C. M. Morris ... Ploughing Match | 27 and 28 May | 17 and 18 June |
| Gladstone ... | Port Curtis Agricultural, Pastoral, and Mining Association | J. T. W. Brown ... | ... | 18 and 19 May |
| Glen Aplin ... | Ballandean Fruitgrowers' Association | W. H. C. Laird ... | | |
| Gooburrum ... | Gooburrum Farmers' and Cane-growers' Association | W. J. Lutin ... | | |
| Goomboorian road *viâ* Gympie) | Ross and Mullin's Creek Farmers' Progress Association | R. E. Kitchen ... | | |
| Goombungee | Goombungee Agricultural, Horticultural and Pastoral Society | J. J. Morgan ... | ... | 24 March |
| Goondiwindi | Comoron-Moorobie Farmers' Progress Association | J. Johnston ... | | |
| Goondiwindi | MacIntyre Pastoral and Agricultural Society | E. T. Drake ... | 29 and 30 April | |
| Gooroolba .. | Gooroolba Farmers and Settlers' Progress Association | H. A. Harrison ... | | |
| Grantham ... | Ma Ma Creek Farmers' Progress Association | A. McKenzie ... | | |
| Gympie ... | Agricultural, Mining, and Pastoral Society | F. W. Shepherd ... | 9 and 10 Sept. | 1 and 2 Sept. |
| Gympie (Goomboorian road) | The Veteran and Scrubby Creek Farmers' Progress Association | T. T. Ramskill ... | | |
| Hambledon (Cairns) | Hambledon Cane Farmers' Association | F. C. P. Curlewis | | |
| Hawthorn (Daymar Siding) | Weengallon Farmers and Settlers' Progress Association | Laurence A. Seeger | | |
| Helidon ... | Flagstone Creek Branch of the Queensland Farmers' Union | Fred Tuffrey ... | | |
| Herberton ... | Herberton Mining, Pastoral, and Agricultural Association | Richard Barton ... | 13 and 14 April | 5 and 6 April |
| Hughenden ... | North Western Queensland Pastoral and Agricultural Association | H. P. Blackall ... | 11 and 12 May | |

## AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914. | 1915. |
| Ingham .. | Herbert River Pastoral and Agricultural Association | R. L. Jones .. | 4 and 5 Sept. | 17 and 18 Sept. |
| Inglewood ... | Inglewood Agricultural, Pastoral, and Horticultural Society | J. F. Cheshire ... | 19 and 2 March | 24 and 25 March |
| Inkerman (Lower Burdekin) | Inkerman Farmers and Graziers' Association | L. M. Osborne ... | | |
| Innisfail ... | Johnstone River Canegrowers and Manufacturers' Association | Ralph Reid ... | | |
| Innisfail ... | Johnstone River Agricultural Society | T. Nesbet ... ... | | |
| Ipswich ... | The Queensland Pastoral and Agricultural Society | G. W. Allen ... | 27 and 28 May | 26 and 27 May |
| Ipswich ... | Ipswich Horticultural Society ... | Hugh Parkinson ... | | |
| Jackson (Western Line) | Parish Woleebee Settlers' Association | S. C. Griffin ... | | |
| Jardine ... | Jardine Farmers' and Fruitgrowers' Association | R. Lemain ... ... | | |
| Juandah ... | Juandah Dairy and Progress Association | R. Bowie ... ... | | |
| Kamma (Cairns) | The Cairns Canegrowers' Association | C. V. Hives ... | | |
| Kenmore ... | Brookfield, Pullen Vale, and Moggill Farmers' Association | F. B. Howard .. | | |
| Kilcoy ... | Kilcoy Pastoral, Agricultural, and Industrial Society | W. E. Reason .. | 14 and 15 May | 6 and May |
| Kilkivan ... | Kilkivan Pastoral, Agricultural, and Industrial Association | F. E. Hopkins ... | 2 July | 9 and 10 June |
| Killarney ... | Killarney Agricultural Society .. | L. W. Wilkinson . | ... | 24 and 25 Feb. |
| Kingaroy ... | Agricultural, Pastoral, and Industrial Society | R. A. Pearce ... | 20 and 21 May | 24 and 25 March |
| Kin Kin, *vid* Cooran | Kin Kin and District Farmers' Progressive Association | A. C. Stewart ... | | |
| Kooroongarra, *vid* Ingle-wood | Kooroongarra Farmers' Progress Association | J. French ... .. | | |
| Laidley ... | Farmers' Progress Association ... | G. A. Moulday ... | | |
| Laidley ... | Lockyer Agricultural and Industrial Society | F. Roberts ... ... | ... | 21 and 22 July |
| Lake Clarendon (*vid* Gatton) | Lake Clarendon Branch of the Queensland Farmers' Union | W. J. Walton . . | | |
| Lockrose ... | Lockrose and District Farmers' Progress Association | R. W. L. Raymont | | |
| Longreach .. | Longreach Pastoral and Agricultural Society | A. Petersen ... | 4 and 5 May | |
| Lowood ... | Lowood and Tarampa Pastoral and Agricultural Association | W. E. Michel ... | 13 and 14 May | 11 and 12 May |
| Mackay .. | Pioneer River Farmers and Graziers' Association | T. J. Leonard ... | 23 and 24 June | |
| Mackay ... | The Pioneer River Farmers and Graziers' Show Association | T. J. Leonard ... | ... | 22 and 23 June |
| Macnade, *vid* Lucinda | Macnade Farmers' Association | E. S. Waller ... | | |
| Malanda ... | Millaa Millaa Settlers' Progress Association | S. S. Buckley .. | | |
| Mapleton ... | Mapleton Fruitgrowers and Farmers' Progress Association | J. G. Smith ... | | |
| Marburg ... | Marburg and District Agricultural and Industrial Association | A. H. Bielefeld ... | 2 and 3 June | 2 and 3 June |
| Mareeba ... | Mareeba District Mining, Pastoral, Agricultural, and Industrial Association | W. A. Ferguson ... | 25 and 26 May | |
| Maryborough | Wide Bay and Burnett Pastoral and Agricultural Society | H. A. Jones ... | 2, 3, and 4 June | 1, 2, and 3 June |
| Miles ... | Miles District Agricultural and Pastoral Society | T. P. Goonan ... | ... | 21 April |

## AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914. | 1915. |
| Minehan's Siding, *vid* Townsville | Haughton River Farmers' Association | W. E. G. Smith ... | | |
| Mitchell ... | Maranoa Pastoral, Agricultural, and Industrial Association | Neil Hammond ... | 12 and 13 May | 11 and 12 May |
| Mondure, *vid* Wondai | Mondure Farmers and Dairymen's Association | G. E. Compagnoni | | |
| Montville ... | Montville Fruitgrowers and Farmers' Progress Association | F. W. Thompson ... | | |
| Mooloolah ... | Mooloolah and Glenview Farmers' Progress Association | William Ellison ... | | |
| Mount Gravatt | Mount Gravatt and District Agricultural, Horticultural, and Industrial Society | J. H. Rackley ... | | |
| Mount Larcom (Gladstone) | Wilmott Farmers' Progress Association | J. J. Kelly... ... | | |
| Mount Larcom | Mount Larcom Farmers' and Canegrowers' Association | Thomas Fraser ... | | |
| Mt. Marshall, *vid* Allora | Mount Marshall Farmers' Progress Association | J. Rooney ... ... | | |
| Mullet Creek | Mullet Creek Farmers' Association... | G. Lee ... ... | | |
| Mundowran | Mundowran Pocket Farmers' Association | E. Canty ... ... | | |
| Mundubbera | Mundubbera Farmers and Settlers' Progress Association | W. G. Parker ... | | |
| Murgon ... | Murgon Branch of the Queensland Farmers' Union | W. D. Davidson ... | | |
| Murray's Creek | Murray and Baffle Creek Progress and Farmers' Association | T. J. Gee ... | | |
| Nambour ... | Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society | A. H. Bushnell ... | 8 and 9 July | 21 and 22 July |
| Nambour ... | Bli Bli Farmers and Fruitgrowers' Progress Association | F. Pashen ... ... | | |
| Nanango ... | Nanango Agricultural, Pastoral, and Mining Society | W. Selby ... ... | 27 and 28 May | 23 and 24 Sept. |
| Nerang ... | Southern Queensland and Border Agricultural and Pastoral Association | Edgar J. Foote ... | | |
| North Arm, N. C. Railway | North Arm Farmers' Progress Association | J. F. Fountain ... | | |
| North Pine ... | The Pine Rivers Agricultural, Horticultural, and Industrial Association | G. W. Armstrong... | 25 and 26 June | 25 and 26 June |
| Oakey ... | Oakey Agricultural and Pastoral Society | Alan B. Stanley ... | 9 Sept. | |
| Oakey Creek, *vid* Eumundi | Kenilworth Farmers' Association ... | Harry Pickering ... | | |
| Okeden, *vid* Wondai | Proston, Okeden, and Wigtoun Settlers' Association | R. McNamara ... | | |
| Oman-ama ... | Redbank Farmers' Progress Association | W. K. Ison ... | | |
| Palmwoods ... | Queensland Farmers' Union (Palmwoods Branch) | W. Browne ... | | |
| Palmwoods ... | Palmwoods Progress and Fruitgrowers' Association | Hugh McVair McKay | | |
| Philpott ... | Philpott Creek Farmers' Progress Association | E. P. Earle ... | | |
| Pickanjennie | Pickanjennie Farmers' Progress Association | J. Proud ... ... | | |
| Pittsworth ... | Pittsworth Pastoral, Agricultural, and Horticultural Association | W. O. Hare ... | 28 Jan. | 27 Jan. |
| Pomona ... | Noosa Agricultural, Horticultural, and Industrial Society | A. H. Shears ... | 4 and 5 Nov. | 17 and 18 Nov. |
| Proserpine ... | Proserpine Farmers and Canegrowers' Association | W. B. Caswell ... | 17 July | |
| Ravenshoe ... | Ravenshoe Farmers and Graziers' Progress Association | W. R. Soilleux ... | | |
| Roche Creek, *vid* Miles | Roche Creek Farmers' Progress Association | G. F. Smith ... | | |
| Rockhampton | Alton Downs Farmers' Association... | G. T. Crook ... | | |

## AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

| Postal Address. | Name of Society. | Name of Secretary. | Show Dates. | |
|---|---|---|---|---|
| | | | 1914. | 1915. |
| Rockhampton | Rockhampton Agricultural Society... | H. Hill ... ... | 18, 19, and 20 June | 27, 28, and 29 May |
| Rockhampton | Jardine Farmers and Fruitgrowers' Progress Association | R. Lamain ... | | |
| Rockhampton | Fitzroy Farmers' Progress Association | T. Ritchie ... ... | | |
| Roma | Western Pastoral and Agricultural Association of Queensland | H. M. Campbell ... | 19 and 20 May | 20 and 21 July |
| Roma ... | Euthulla and Upper Bungil Farmers and Settlers' Association | John J. Maun ... | | |
| Rosewood ... | Rosewood Agricultural and Horticultural Association | A. J. Loveday ... | 29 and 30 July | 28 and 29 July |
| Sexton ... | Sexton Farmers and Settlers' Progress Association | W. K. Harvey ... | | |
| Speedwell, *viâ* Stalworth | Speedwell Farmers' Progress Association | Aubray U. Potter | | |
| Springsure ... | Springsure Pastoral and Agricultural Society | W. Fisher ... ... | 13 and 14 May | 12 and 13 May |
| St. George ... | Balonne Pastoral and Agricultural Association | Mark Roberts .. | | |
| Stanthorpe ... | Stanthorpe Agricultural Society ... | A. E. Bateman ... | ... | 2, 3, and 4 Feb., 1916 |
| Tabragalba ... | Tabragalba and Canungra Farmers' Progress Association | A R. Ludwig ... | | |
| Takura, *viâ* Maryboro' | Takura Farmers' Union ... ... | S. E. Tooth ... | | |
| Teutoberg ... | Teutoberg Farmers' Progress Association | E. H. Ochmichen ... | | |
| The Caves, *viâ* Rockhampton | Mount Etna Farmers and Selectors' Progress Association | Geo. Smith ... | | |
| The Gums, *viâ* Tara | The Gums and Horse Creek Pastoral and Agricultural Association | Arthur Henry ... | | |
| Tolga ... | Tolga Forest Farmers' Union ... | H. Northey ... | | 1915. |
| Toowoomba... | Royal Agricultural Society of Queensland | G. Noble ... ... | 21 to 23 April | 13, 14, and 15 April |
| Toowoomba... | Toowoomba White Growers' Association | A. C. Salmon ... | | |
| Townsville ... | Townsville Pastoral, Agricultural, and Industrial Association | J. N. Parkes .. | 14 and 15 July | 29 and 30 June |
| Wallumbilla | Wallumbilla Farmers' Association ... | H. A. Watson ... | | |
| Warwick .. | Eastern Downs Horticultural and Agricultural Association | F. H. Selke ... | 10 to 12 Feb. | 9, 10, 11, & 12 Feb. |
| Wellington Point | Wellington Point Agricultural, Horticultural, and Industrial Association | E. Ziegenfusz ... | 4 July | |
| Wondai ... | Wondai Agricultural, Pastoral, and Industrial Society | H. J. Compagnoni | 13 and 14 May | 26 and 27 May |
| Wondalli, *viâ* Goondiwindi | Wondalli-Yelarbon Farmers' Progress Association | L. C. G. Cameron | | |
| Woodend ... | Warren-Woodend Farmers' Club ... | W. Lehfeld ... | | |
| Woodford ... | Woodford Agricultural, Pastoral, and Industrial Society | G. H. Osmond ... | 28 and 29 May | 22 and 23 April |
| Woombye ... | North Coast Agricultural and Horticultural Society | E. E. McNall ... | 10 and 11 June | 23 and 24 June |
| Woombye ... | Woombye Fruitgrowers' and Progress Association | J. Howe ... ... | | |
| Woongarra ... | Woongarra Canegrowers and Farmers' Union | H. A. Cattermull... | | |
| Woowoonga Scrub | Woowoonga Farmers and Canegrowers' Association | Thos. Wilkins ... | | |
| Yandina ... | Maroochy River Farmers' Union and Progress Association | D. G. Martin ... | | |
| Yandina Creek *viâ* North Arm, N.C. Line | Yandina Creek Farmers and Settlers' Progress Association | J. D. Benfer ... | | |
| Yingerbay ... | Yingerbay Dairymen and Farmers' Association | R. Frederick ... | | |
| Zillmere ... | Zillmere Agricultural, Horticultural, and Industrial Society | Arthur B. Marquis | 3 Oct. | 18 Sept. |

# Departmental Announcements

The Editor will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

Secretaries of Associations are requested to be good enough to forward to the Editor, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published.

It is equally necessary that prompt notice be given to the Editor of changes in the Secretaryship of any Society or Association, a matter which is much neglected. Furthermore, information concerning dates on which shows are to be held must be forwarded to the Editor at least six weeks before the Show date. If these suggestions are not complied with, the Society whose Secretary neglects to supply the required information will be liable to be struck off the list of Societies published monthly in the Journal.

To enable recipients of the *Queensland Agricultural Journal* to have the half-yearly volume bound, Covers in Boards and Cloth will be supplied from this Office on application to the Under Secretary for Agriculture. Applications must be accompanied by a remittance to cover cost. Covers will be supplied at One Shilling and One Shilling and Ninepence each.

In order to avoid disappointment, correspondents who wish for replies to questions in the Journal are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

Persons desiring to communicate with the Queensland Agricultural College and State Farms are requested to address their correspondence to the Principal of the College, Gatton, and to the Managers of the State Farms. The State Farms are: Hermitage (Warwick), Gindie (*viâ* Springsure), Warren (Stanwell), Bungeworgorai (Roma), Kairi (Tolga), Kamerunga State Nursery (Cairns).

We would ask our Subscribers to note that, when their Subscription has run out, a RED CROSS is placed against the Order Form. It often happens that this intimation is disregarded, with the result that the JOURNAL is NOT POSTED to the Subscriber. The Department cannot guarantee to supply back numbers in such cases.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the Institution. Supplies of hot water and milk can be obtained at the College, if desired.

The Department has now prepared a booklet on "Flower Gardening for Amateurs," which may be obtained on application to the Under Secretary for Agriculture and Stock. Price, TWO SHILLINGS.

Pamphlets on different subjects relating to Agriculture, Horticulture, and Stock are issued by the Department, and may be obtained gratis, on application to the Under Secretary.

## NOTICE OF SHOW DATES.

We wish to draw the attention of Secretaries of Agricultural and Pastoral Societies and Associations to the importance of promptly notifying the Editor of any change in the dates on which shows are to be held.

# QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

## FOR SALE.

GRASS ROOTS.—Paspalum and Rhodes Grass at 2s. 6d. per sack, f.o.b., Gatton. JAPANESE MILLET SEED.—Price, 3d. per lb., or 25s. per cwt., f.o.b., Gatton.

Applicants will be supplied on receipt of remittance to the amount of the Order. There are no other Farm Seeds or Produce at present for Sale at the College.

## POULTRY DEPARTMENT.

The College has for sale Poultry of the following breeds:—Brown Leghorn, White Leghorn, Silver-Grey Dorking, Indian Game, Plymouth Rock, Black Orpington, Buff Orpington, Silver-Laced Wyandotte, and White Wyandotte.

## PRICES.

Cockerels, 10s., 15s., and 21s., f.o.b., Gatton.

Pairs—Cockerel and Pullet—30s. and 42s., f.o.b., Gatton.

Trios—Cockerel and Two Pullets—42s. and 63s., f.o.b., Gatton.

Prices vary, as above stated, according to quality. Additional charges of 2s. for a single bird and 1s. for each additional bird will be incurred by purchasers who fail to return crates promptly.

Eggs of the above breeds are offered for sale during the season, 1st July to 30th November. Price, 10s. per setting of twelve, f.o.b., Gatton. Nine eggs in each setting are guaranteed fertile. Should less than nine prove to be fertile, the infertiles will be replaced, if returned, carriage paid, and unbroken.

(N.B.—An infertile egg is uniformly translucent when held up to a strong light. Settings should be allowed to settle 24 hours before being placed under the hen.)

In cases where eggs cannot be sent otherwise than by parcel post, sixteen eggs will be sent to a setting, and no responsibility will be taken in connection with the replacing of any eggs which fail to hatch.

Applications for birds or eggs should be accompanied by remittance and addressed to the Principal, Agricultural College, Gatton.

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The following Stud Animals are available for Service at the College Farm:—

**AYRSHIRE**—

Netherton King George, Imported. Sire: Netherton King Arthur. Dam: Midland Young Greenfield.

**SHORTHORN BULL**—

Bloomer of Darbalara. Sire: Emblem of Darbalara, 100 M.S.H.B. Dam: Lucy II., 1038 M.S.H.B.

Sows may be served also by imported Berkshire, British Large Black, and Yorkshire Pigs, at a charge of 5s. for each service.

Consequent on the numerous orders on hand for Pigs for forward delivery, it will be several months before there is any likelihood of fresh orders being filled.

A charge of **Two Shillings and Sixpence** will be made if Sows are left at the College for three weeks, for second service if required, for the keep of each animal.

Orders will be accepted after the 1st January, 1915, for **Berkshire** and **Yorkshire Boars.** It will, however, be some months before orders for Sows of either breed can be booked.

J. BROWN, Principal.

# QUEENSLAND AGRICULTURAL COLLEGE.

The College, which is situated within 4 miles of Gatton and 1 mile from the College Railway Siding, comprises 1,692 acres, and the buildings can accommodate 60 Students.

### TERMS.

**Twenty-seven Pounds** per annum, paid half-yearly in advance. Students are also charged One Pound per annum each for medical attendance, the sports fund, and for guarantee fee.

The course of instruction includes **Practical Agriculture** in all its branches, **Dairying, Gardening, Stock-Breeding, and Mechanical Arts.** Classes are also held daily for **Theoretical Instruction** in these branches, as well as in **Surveying, Chemistry,** &c.

The College Calendar, giving full particulars, may be obtained on application to the Principal at the College, or to the Under Secretary for Agriculture and Stock, Brisbane.

### BURSARIES.

Four bursaries are given annually. An examination for these is held in December of each year. Bursaries will be awarded upon the following conditions:—Candidates (males) to be from fifteen to eighteen years of age, of sound constitution, and in good health; they must have resided in the State for the two years immediately preceding the time of their examination for such bursary; or their parents must have resided in the State three years immediately preceding such examination. The bursar is entitled—subject to good behaviour and the pleasure of Parliament—to free board and instruction as a resident student for a period of three years. He is required to take up his residence at the College within one month of the publication of the results of the examination; otherwise he forfeits his right to a bursary.

The **Age of Candidates** for Admission to the College as Students is Fourteen Years.

Full particulars and conditions on application to

**The Under Secretary,**
Department of Agriculture and Stock, Brisbane.

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# STATE FARM - - WARREN.

## Stock for Sale.

YOUNG **AYRSHIRE BULLS.** Prices and particulars on application. Young **BERKSHIRE BOARS** and **SOWS.** Prices: Boars, £2 2s.; Sows, £1 1s. F.O.B., Warren. Crates returned.

Roots of the following Grasses for sale at 2s. 6d. per sack. F.O.B., Warren:—**Rhodes, Paspalum, Giant Couch.**

**FOR SERVICE.**—The Imported **Clydesdale Stallion, "Sir George."** Fee: £2 2s. per mare; and 1s. per week agistment. **Ayrshire Dairy Bull, "Naomi's Arthur."** Fee: 5s. per cow; and 6d. per week agistment. **Two Imported Berkshire Boars**—"Peterkin W." and "Flockmaster." Fee: 5s. per sow; and 1s. per week agistment.

**THOS. JONES,** Manager.

**Department of Agriculture and Stock, Queensland.**

# "The Fruit Cases Act of 1912."

Attention is drawn to the Regulations under this Act which come into force on the 1st June, 1915, and it is notified that on and after that date fruit that is sold in cases or is exported to any place within the Commonwealth must be in cases of the dimensions mentioned below. Bananas are excepted from the operations of the Queensland Act.

The sizes of the fruit cases required in New South Wales are of the same dimensions as those in the Queensland Act. The New South Wales Regulations are already in force.

Any case must be of one of the following **inside** measurements, **clear of any divisions.**

| | LENGTH. inches. | DEPTH. inches. | WIDTH. inches. |
|---|---|---|---|
| (1) 1 bushel .. .. .. | 18 | $14\frac{1}{4}$ | $8\frac{2}{3}$ |
| (2) do. .. .. .. | 26 | $14\frac{1}{4}$ | 6 |
| (3) do. .. .. .. | 20 | 10 | $11\frac{1}{8}$ |
| (4) $\frac{1}{2}$ bushel .. .. .. | 18 | $7\frac{1}{8}$ | $8\frac{2}{3}$ |
| (5) do. .. .. .. | 26 | $7\frac{1}{8}$ | 6 |
| (6) do. .. .. .. | 18 | $5\frac{1}{4}$ | $11\frac{3}{4}$ |
| (7) $\frac{1}{4}$ bushel .. .. .. | $13\frac{3}{4}$ | 4 | $10\frac{1}{8}$ |
| (8) Tropical Fruit Case (for Pineapples, etc.) | $24\frac{3}{4}$ | 12 | 12 |

### New or Clean Cases.

1. All cases for the Queensland trade must be new or clean and free from insect or fungus diseases.

2. New cases only must be used for fruit exported to any of the other Australian States.

3. New cases only must be used (under any circumstances) in the fruit districts of Stanthorpe and Bowen.

### Case to show Maker's Name, Address, and Guarantee.

Every case, whether the fruit is for sale in Queensland or in another Australian State, must have legibly and durably on one end of the outside of the case:—

1. The name and address of the packer of the case.
2. The words "guaranteed by packer to contain 1 Imperial bushel" or as the size of the case may warrant.

In the case of the Tropical Fruit Case the guarantee should be—"Guaranteed by maker to contain not less than 3,564 cubic inches."

The above name, address, and guarantee should be at least 5 inches long and 2 inches wide; but stamps 3 inches by 1½ inches and upwards will be accepted.

### Exception.

The Act will not apply to the sale of fruit sold in trays, baskets, casks, or buckets, or to crates which contain trays of fruit. Fruit so packed, however, must have marked on the package the weight or number of its contents.

### Contraventions.

Penalties are provided for persons who—

1. Pack fruit for the Queensland trade in disease-affected cases.
2. Export fruit to another Australian State in second-hand cases.
3. Obstruct or refuse to give information to an Inspector who is carrying out the Act.
4. Place an incorrect guarantee on a case.
5. Export fruit in a case carrying an incorrect guarantee.
6. Alter the size of a case bearing the packer's name, address, and guarantee.
7. Interfere with the packer's name, address, or guarantee on the case.

**ERNEST G. E. SCRIVEN,**
**19th April, 1915.** **Under Secretary.**

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### SEEDS AVAILABLE.

**Sorghum**—Favorita. A limited quantity at 6d. per lb.

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**Red Kafir,** 3d. per lb. A limited quantity.

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Those desirous of obtaining Stock from this Farm should apply to the Manager, from whom all particulars can be obtained,

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DOUBLE VACCINE (powder form) for the PREVENTION of BLACKLEG is now prepared by the Department of Agriculture and Stock, and may be obtained in Tubes containing not less than Ten Doses, at a cost of 3s. per Ten Double Doses.

Full Instructions for Use are sent with the Vaccine.

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STOCK EXPERIMENT STATION,
YEERONGPILLY,
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By Authority: ANTHONY JAMES CUMMING, Government Printer, Brisbane.

THE LATE MR. F. M. BAILEY, C.M.G., F.L.S.

The accompanying portrait of the late much-esteemed Colonial Botanist, Mr. F. M. Bailey, was, owing to an oversight, omitted in our August issue. Mr. Bailey always wished to retain his original title of "Colonial," in preference to "Government," Botanist.

[*Frontispiece.*

QUEENSLAND AGRICULTURAL JOURNAL

VOL. IV. SEPTEMBER, 1915. PART 3.

# Agriculture.

## COMPLETE FERTILISERS FOR FARM, ORCHARD, AND VEGETABLE GARDENS.

### CUCUMBERS.

This vegetable may be grown on almost any soil, as long as it is fairly light and loamy, and plenty of manure is added. The pits or hills should be prepared by mixing a large amount of well-rotted stable manure, sheep or fowl dung, ashes, and bonedust with the soil.

Apply in addition the following artificial fertilisers:—

3 to 4 cwt. of superphosphate
$1\frac{1}{2}$ to 2 cwt. of sulphate of potash
$1\frac{1}{2}$ cwt. of sulphate of ammonia or nitrolim
} per acre;

or the same amounts in pounds to every 43 square yards.

An excessive amount of nitrogenous manure, more particularly in

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the form of quick-acting nitrates, may cause an excessive growth of vines and poor quality of cucumbers.

## LEEKS and ESCHALOTS.

These vegetables require a deep, rich, sandy loam, a liberal manuring with stable manure, ashes, bonedust, &c., when preparing the bed, and a copious supply of liquid manure during their growth.

A complete fertiliser is made up as follows:—

4 to 6 cwt. superphosphate
1 to 1½ cwt. sulphate of potash
2 to 3 cwt. sulphate of ammonia or nitrolim
} per acre;

or the same quantities in pounds to every 43 square yards.

## LETTUCE.

Lettuce requires a rich loam, in order to grow very quickly, and in good soil the addition of artificial fertilisers will produce large crisp plants.

Use per acre 8 to 12 cwt., or per square yard 3 to 4 oz., of a fertiliser containing 6 to 8 per cent. phosphoric acid, 4 to 6 per cent. nitrogen, and 8 to 10 per cent. potash; or the following mixture:—

4 to 6 cwt. superphosphate
1½ to 3 cwt. sulphate of potash
2 to 4 cwt. nitrolim or sulphate of ammonia
} per acre.

## LUCERNE.

Lucerne, one of our most valuable fodder-plants, grows well on rich loams, and clayey soils, containing plenty of lime, and having a mellow, fairly open, or even gravelly subsoil. Clayey soil, deficient in lime, may be made to grow lucerne if the land is heavily limed with ground limestone, at the rate of one to three tons per acre. Some light sandy soil, with a clayey or gravelly subsoil, may also be made fit for lucerne by liming. Nitrogenous manure is, as a rule, not required, but a small dressing with nitrolim or nitrate of lime, at the rate of ½ to 1 cwt. per acre, at the time of sowing, may act as a stimulus and give the plants a chance to establish themselves in poorer soils. The plant requires an ample supply of potash and phosphoric acid, and an annual application of 3 to 6 cwt. of a fertiliser mixture, containing 6 to 8 per cent. phosphoric acid and 10 per cent. of potash, is to be recommended.

The following manures may be applied broadcast every year:—

2 to 3 cwt. superphosphate
1 to 1½ cwt. sulphate of potash or muriate of potash
} per acre;

or,

3 to 4 cwt. Thomas phosphate
1½ to 3 cwt. kainit
} per acre

## MANGOLDS and SWEDES.

Mangolds, like Swedes and beets, are a very exhaustive crop and require a fairly rich loamy soil. Whenever possible from 10 to 20 tons of well-rotted farmyard manure should be applied, per acre, when

preparing the land for sowing. This crop is one of the few which prefers the potash in the form of chloride or muriate, and if the usual sulphate of potash is used, an equal amount of common salt may be added. The following mixture of artificial fertiliser will be found to give greatly increased crops:—

2 to 3 cwt. superphosphate
1 to 1½ cwt. muriate of potash
2 cwt. nitrolim or sulphate of ammonia
} per acre;

or,

2 to 3 cwt. superphosphate
1 cwt. sulphate of potash
2 cwt. common salt
2 cwt. nitrolim or sulphate of ammonia
} per acre.

## MARROWS, PUMPKINS, and SQUASHES.

Marrows do best on a fairly rich loamy soil, with a stiff subsoil, and many of our scrub soils are particularly suitable for these vegetables. With the aid of artificial fertilisers they may be grown on lighter soil, in which case the amount of artificial fertiliser may be increased up to 8 and 10 cwt. per acre or 8 to 10 lb. to every 43 square yards.

The following mixed fertiliser will be found suitable:—

3 to 4 cwt. superphosphate
1½ cwt. sulphate of potash
1½ to 2 cwt. nitrolim or sulphate of ammonia
} per acre.

## OATS.

This cereal may be grown on almost any class of soil, but requires a fairly cool and moist climate.

When grown on a soil of average quality apply per acre from 3 to 5 cwt. of a mixed fertiliser containing from 6 to 8 per cent. water-soluble phosphoric acid, 8 per cent. of potash, and 4 to 5 per cent. nitrogen, or the following mixture:—

1½ to 3 cwt. superphosphate
½ to 1 cwt. sulphate of potash
½ to 1 cwt. nitrolim or sulphate of ammonia
} per acre.

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## LAYING OF WHEAT.

By BENJAMIN WILSON.

Some farmers, in their eagerness to obtain as big a wheat crop as possible, plant their seeds as close as they possibly can; with the result that light cannot pass between the plants and the stems become long and slender. The stems are thus no longer able to support the weight of the ears of corn and "laying" results. For the healthy growth of wheat a certain intensity of light is essential. The light acts directly on the protoplasm and gives to it some of the energy it utilises in constructive metabolism; thus it exerts a tonic influence on

the development of the cornstalk. Without entering into detailed botanical explanations, it may be said that while light is not absolutely essential for growth it is still necessary for healthy growth. Plants will grow faster in the dark than in the light, as may be seen in rhubarb, which when forced in the dark has small leaves and long slender stems. When grown in the light, the stem of rhubarb is short and thick. Speaking generally, it may be said that most plants grown in the dark have soft stems, which are very much elongated and sickly in colour.

Plants grow more rapidly during the night than during the day. During daylight food formation takes place, and the materials then stored are used up during darkness in producing the permanent change in the plant. From what has been said it will be seen that the remedy for laying of wheat is to widen the distance between each seed. The trouble will then be averted.

## STOCK FOODS.

By J. C. BRÜNNICH, Agricultural Chemist.

The dairy farmers of this State have again passed, on account of scarcity and high cost of feed, through an exceedingly trying time, and in a very large number of cases hand feeding had to be resorted to. At such times it is of utmost importance to have some knowledge of the composition of various fodders, and more particularly of the more common commercial concentrated foodstuffs, which will have to be used in connection with poorer foods to keep the stock in good condition. The monetary value of such foods can only be judged by comparing their composition.

A very large number of various grasses, cereals, leguminous crops, grains and seeds, and root crops, have been analysed at our agricultural laboratory from time to time, and the results published in our annual reports. As these reports are not always to hand, I have had prepared a short table of the analysis and composition of the most common stock foods, which appeared in article under the same heading in the "Agricultural Journal" two years ago. Since that time a large number of various grasses, and of common pasture, at different periods of growth, have been analysed, and the variation in composition was found to be very striking,* so that it was considered of more value to average the results of all the analyses in the preparation of the new table.

In the table (Table II.) at the end of this paper the amounts of constituents most important for nutrition contained in every 100 lb.

* Annual Report of Agricultural Chemist, 1914.

of fodder are given under the headings: **Crude Protein, Carbohydrates, Crude Fibre, Crude Fat,** and **Crude Ash.** Only parts of these constituents become really **available** to the animal by being more or less digestible. Again, we must bear in mind that the various classes of farm stock, and even individual animals of each class, have a greatly varying power of digestion. All ruminants—animals like oxen, cows, sheep, and goats, which chew their cud—digest much larger proportion of the nutriment constituents of foods than non-ruminant animals, like horses, pigs, &c. This variation in digestibility applies more particularly to the coarse and bulky fodders, straws and hay, of which a horse digests much less than a cow or sheep.

Unfortunately, no actual feeding experiments on the digestibility of our stock foods have been carried out in Queensland, and all our calculations of the digestible portions of such foods have to be based on European and American experiments. The **values of digestible** constituents, contained in every 100 lb. of fodder, are calculated (in Table II.) on the average digestion of ruminants, and apply therefore chiefly to the feeding of cows, sheep, &c. The values would be lower when the fodders are used for the feeding of horses and pigs.

When calculating actual rations the values of digestible nutrients have again to be modified, as in all cases a certain amount of energy is required for mastication and digestion itself, and the "**availability**" of a food for actual productive purposes will in many cases be very considerably lowered. Of the digestible nutrients in the more easily digested fodders, like roots, grain, meals, &c., as much as 95 per cent. may be available, but in the case of rough fibrous foods, straw, poor coarse hay, &c., only 30 per cent., or about one-third, of the food is actually made use of, two-thirds of the energy being wasted for mastication and digestion. A liberal extra allowance has therefore to be made when using coarser fodders in the making up of rations. As a matter of fact, when feeding horses with coarse fodder like straw or poor quality of hay, so much energy is consumed in digestion that nothing is left to enable the animal to perform any work.

The nitrogenous compounds, included under the heading "**Crude Proteins,**" are called the **flesh-forming constituents** of food, as their chief function is the production of blood, muscle, and repair of waste tissue. The **nitrogen-free compounds** come under the headings: Carbohydrates (starch and sugars), crude fibre, and crude fat, which all are **heat** or **energy producers,** and may also form fat.

Every efficient food ration must contain a minimum amount of proteins and a certain amount of total heat or energy producing con-

stituents, and in order to avoid waste of one or the other, a certain ratio, called the **nutritive ratio,** between the amounts of digestible proteins and digestible non-nitrogenous (energy producing) nutrients has to exist in a properly balanced ration. This ratio must be changed in accordance with age and the amount of work to be performed by the animal.

When judging the value of fodder as food for stock we have to consider besides the practical points of succulence, flavour, and palatability, the chemical composition with regard to the amounts of: 1st, nitrogenous constituents; 2nd, heat or energy producing nutrients; 3rd, mineral matter; and, lastly, of water.

The amount of **water,** or rather the ratio between water and total dry food material, is of some importance, cattle requiring a ratio of about 4 to 1, sheep only 2.1, whilst horses, according if they are at rest or working, require ratios of 2.1 to 3.6 to 1. When feeding cattle with dry rations larger amounts of water are required; as soon as roots are fed, the quantity of water required is much less, and when feeding very succulent watery foods, as, for instance, prickly-pear leaves, no water at all need be supplied; in fact, giving water to cattle so fed may be even dangerous.

The **energy value** of a fodder may be measured by the amount of heat evolved on burning, and may also be called **fuel value.** For the calculation of this value, starch is taken as the unit, the other carbohydrates, sugars and fibre, are taken of the same heat value, fat produces 2.3 times the amount of heat, and protein only about $\frac{9}{10}$ the amount. The total amount of energy produced by all the digestible nutrients of a food is also expressed as its **starch value (equivalent),** and may be used for comparison of the feeding value of the various fodders.

The old feeding standards of *von Wolff* have been slightly modified on the results of more recent feeding experiments carried out by *Professor Kellner,* of the Möckern Experiment Station in Germany, and he applies in his feeding standard principally the starch equivalent of foods for the making up of suitable rations. Carefully conducted trials carried out in Denmark and Sweden, which were made more particularly to ascertain the milk production from certain rations, gave results closely approximating the values based on Kellner's starch equivalents.

In the following short table the actual net available amounts of energy produced by food is taken into account, and all compared with wheat taken as the unit.

**Equivalent Quantities of Food.**

| — | Based on Kellner's Starch Equivalent. | Danish Scale. | Swedish Scale. | Lawe's and Gilbert's Scale. |
|---|---|---|---|---|
| Wheat .. .. .. | 1 | 1 | 1 | 1 |
| Bran .. .. .. .. | 1·5 | 1 | 1·1 | 1·25 |
| Oil Cake .. .. .. | ·9 to 1·1 | 1 | ·85 to 1 | ·9 to 1·1 |
| Clover Hay .. .. .. | 2·2 | 2 | 2·5 | 2 |
| Meadow Hay .. .. .. | 2·3 | 2·5 | 2·6 | 2·1 |
| Mangolds .. .. .. | 11 | 10 | 10 | 13 |
| Turnips .. .. .. | 15 | 12 | 12·5 | 19 |
| Straw .. .. .. .. | 4·2 | 4 | 4 | 2·5 |
| Green Fodder .. .. | 7 to 9 | 10 | 7·5 to 11 | .. |
| Potatoes .. .. .. | 3·8 | 4 | 5 | 8·5 |

In order to compare this table with the values given in my larger table at the end of this paper, in which the starch equivalent of wheat is taken as 16, meaning that it takes 16 lb. of wheat to supply a cow of 950 to 1,000 lb. live weight with sufficient amount of energy-yielding nutrients for the production of 25 lb. of milk daily, we find, for instance, straws to have a starch equivalent from 23 to 28 lb., thus requiring theoretically from $1\frac{1}{2}$ to 2 times the weight, as compared with weight of wheat, to supply the necessary amount of carbohydrates or fuel value.

As already stated, a large amount of energy is wasted in the mastication and digestion of straw, and therefore according to Kellner's and other practical tests, straw must be actually fed about 4 times the amount of wheat to produce the same energy. In the case of more digestible foods the difference between our theoretical starch values and Kellner's available starch equivalent will seem much smaller, and we find, for instance, that they practically agree in the case of bran, oilcakes, and potatoes.

For the actual calculation of rations for farm stock we must now take Table I. of "Kellner's Standard Rations," which we find gives values slightly lower than those given in von Wolff's table previously published. Again, in the case of two values being given we may safely assume that with our more favourable climatic conditions the lower value will suffice for the rations of our stock.

## TABLE I.

### Kellner's Standard Rations.

PER 1,000 LB. LIVE WEIGHT PER DAY.

| Animal. | Dry Matter in Total Ration. | DIGESTIBLE. | |
|---|---|---|---|
| | | Protein. | Starch Equivalent. |
| Horse (light work) .. .. .. .. .. | 18-23 | 1·0 | 9·2 |
| Horse (medium work) .. .. .. .. | 21-26 | 1·4 | 11·6 |
| Horse (heavy work) .. .. .. .. .. | 23-28 | 2·0 | 15·0 |
| *Fattening Cattle—* | | | |
| At 550 lb. live weight .. .. .. .. | 26 | 2·8 | 14·4 |
| At 770 lb. „ „ .. .. .. .. | 26 | 2·2 | 11·2 |
| At 950 lb. „ „ .. .. .. .. | 26 | 1·5 | 10·0 |
| *Milch Cattle—* | | | |
| Yielding 10 lb. milk .. .. .. .. | 22-27 | 1·1-1·3 | 7·8-8·3 |
| Yielding 20 lb. „ .. .. .. .. | 25-29 | 1·6-1·9 | 9·8-11·2 |
| Yielding 30 lb. „ .. .. .. .. | 27-33 | 2·2-2·5 | 11·8-13·9 |
| Yielding 40 lb. „ .. .. .. .. | 27-34 | 2·8-3·2 | 13·9-16·6 |
| *Fattening Lambs—* | | | |
| 65 lb. live weight .. .. .. .. | 31 | 3·5 | 17 |
| 110 lb. „ „ .. .. .. .. | 28 | 2·5 | 15 |
| Full grown .. .. .. .. .. | 24-32 | 1·6 | 14·5 |
| *Fattening Pigs—* | | | |
| 44 lb. live weight .. .. .. .. | 44 | 6·2 | 33·8 |
| 110 lb. „ „ .. .. .. .. | 36 | 4·5 | 32·0 |
| 200 lb. „ „ .. .. .. .. | 28 | 3·0 | 24·5 |

In this table all rations are calculated as required per day and per 1,000 lb. live weight. From the table we see that a horse heavily worked requires double the amount of proteins than a horse with light work. When fattening cattle or pigs, the amount of protein in the ration is reduced as the animals increase in weight. The quantities of digestible nutrients necessary for the calculation of rations may all be taken from Table II.

In order to make comparison easier the last two columns of Table II. give the **starch** and **protein equivalents** of each fodder expressed as the quantity of food in lb. required to be fed daily to a cow from 750 to 900 lb. live weight yielding about 25 lb. of milk and requiring about 26 lb. dry material, containing 1·9 lb. protein and 11 lb. starch value. Nearly the same amounts of food would be required by a horse fairly heavily worked. In all cases where the amounts of starch and protein equivalents are about the same, we know that the fodder is a well-balanced ration. We find that 16 lb. of wheat would supply the necessary amount of protein and starch, but the total weight of dry matter, of which a cow requires about 26 lb., would not be sufficient.

Of Couch grass and Prairie grass, some of the most ideal feeds for dairy cattle, about $\frac{3}{4}$ cwt. are required to supply the necessary protein and starch.

If we look at lucerne hay we find that about 24 lb. are required to supply the necessary amount of energy, but that only 17 lb. are required to supply the necessary protein, because lucerne hay has a nutritive ratio of 1 to 3·3, which indicates that it contains too much nitrogenous nutrient material as compared to carbohydrates, whereas a cow requires a ratio of about 1 part of digestible proteids to 5·4 parts of digestible carbohydrates, including fat.

When feeding, therefore, cows entirely on lucerne hay, we supply more nitrogenous material than necessary, which consequently goes to waste. It is therefore an advantage to feed a small quantity of lucerne hay and supplement the feed with fodders containing a comparatively higher amount of carbohydrates and fats, or of a wider nutritive ratio, like wheat straw, bush hay, potatoes, &c.

When using fodders like prickly-pear leaves, rather poor in nitrogenous nutrients, the fodder must be supplemented with concentrated foods rich in nitrogenous constituents like cotton-seed meal, linseed meal, or oilcake.

A cow could consume, say, 60 lb. of prepared prickly-pear leaves per day and gets therefore $\frac{6}{10}$ of .3, or about .2 lb., of digestible protein and $\frac{6}{10}$ of 6, or 3·6 lb., of starch. To supplement the ration we give in addition 25 lb. bush hay, and supply therefore $\frac{1}{4}$ of 3.2, or ·8 lb., protein, and $\frac{1}{4}$ of 56.6, or 14.2 lb., starch. The cow will get a total of 1 lb. of protein and 17·8 of starch, or only about half the amount of nitrogen required. In order, therefore, to make a complete ration we must add $2\frac{1}{2}$ lb. cotton-seed meal, or 3 lb. linseed meal, or 6 lb. of oilcake to supply the deficiency of ·9 lb. of protein.

Any other ration can be calculated in a similar manner.

Table II.

## COMPOSITION OF FODDERS.

Giving pounds of food materials, and of water, and of digestible nutrients contained in every 100 lb. of fodder.
Pounds of each fodder required to supply a cow of 750 lb. to 900 live weight, yielding 25 lb. milk daily, with 11 lb. starch value, and 1·9 lb. protein.

| — | Water. | Crude Protein. | Carbohydrates. | Crude Fibre. | Crude Fat. | Crude Ash. | DIGESTIBLE NUTRIENTS. True Protein. | Carbohydrates. | Fibre. | Fat. | Nutritive Ratio (1 ÷) | Starch Value. | LBS. OF FODDER TO GIVE. Starch Equivalent to 11 lb. Starch. | Protein Equivalent to 1·9 lb. Protein. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Green Fodders*— | | | | | | | | | | | | | | |
| Grasses and Cereals— | | | | | | | | | | | | | | |
| Barley | 79·0 | 2·7 | 8·0 | 7·9 | ·6 | 1·8 | 1·4 | 5·7 | 4·8 | ·4 | 8·1 | 12·8 | 86 | 136 |
| Buffalo grass | 78·0 | 2·1 | 12·3 | 4·6 | ·5 | 2·5 | 1·2 | 9·0 | 2·9 | ·4 | 10·7 | 13·9 | 79 | 158 |
| Couch grass | 74·1 | 4·1 | 10·0 | 8·4 | ·4 | 3·0 | 2·4 | 7·3 | 5·3 | ·3 | 5·5 | 15·5 | 71 | 79 |
| Grass, mixed pasture | 62·1 | 2·4 | 14·8 | 15·6 | ·6 | 4·5 | 1·3 | 10·8 | 9·8 | ·45 | 16·7 | 22·9 | 48 | 146 |
| Maize | 70·9 | 2·6 | 13·4 | 9·6 | ·5 | 3·0 | 1·2 | 9·8 | 6·4 | ·4 | 14·3 | 18·2 | 60 | 158 |
| Indian cane | 77·0 | 1·5 | 11·0 | 8·9 | ·2 | 1·4 | 1·7 | 7·9 | 6·0 | ·2 | 20·5 | 15·0 | 73 | 272 |
| Oats (in green head) | 79·0 | 1·8 | 11·9 | 5·1 | ·5 | 1·7 | 1·0 | 7·5 | 3·6 | ·4 | 12·0 | 12·9 | 85 | 190 |
| Paspalum | 74·7 | 2·3 | 9·9 | 10·2 | ·5 | 2·4 | 1·3 | 7·2 | 6·4 | ·4 | 11·3 | 15·7 | 70 | 146 |
| Prairie grass | 76·8 | 4·3 | 8·3 | 7·2 | ·8 | 2·6 | 2·1 | 6·1 | 4·5 | ·6 | 5·7 | 13·9 | 79 | 90 |
| Rhodes grass | 70·3 | 2·2 | 11·8 | 12·2 | ·5 | 3·0 | 1·0 | 8·6 | 7·7 | ·4 | 17·2 | 18·1 | 61 | 190 |
| Sorghum | 70·6 | 2·1 | 15·1 | 9·1 | ·6 | 2·5 | ·8 | 11·3 | 5·4 | ·5 | 22·3 | 18·6 | 59 | 238 |
| Summer grass | 72·0 | 1·4 | 13·1 | 10·0 | ·3 | 3·2 | ·6 | 9·6 | 6·3 | ·2 | 27·2 | 16·9 | 65 | 317 |
| Sugar-cane tops | 72·7 | 2·4 | 12·3 | 10·0 | ·8 | 1·8 | 1·1 | 8·9 | 6·7 | ·6 | 15·4 | 18·0 | 61 | 173 |
| Legumes— | | | | | | | | | | | | | | |
| Cowpea vines | 79·1 | 3·3 | 8·3 | 5·5 | ·9 | 2·9 | 1·9 | 6·2 | 2·9 | ·5 | 5·4 | 12·0 | 92 | 100 |
| Lucerne | 76·0 | 5·4 | 8·3 | 6·8 | ·7 | 2·8 | 3·0 | 6·1 | 3·4 | ·3 | 3·4 | 12·9 | 85 | 63 |
| Various— | | | | | | | | | | | | | | |
| Prickly-pear (leaves) | 89·7 | ·5 | 7·0 | 1·1 | ·1 | 1·6 | ·3 | 4·8 | ·7 | ·1 | 19·8 | 6·0 | 183 | 634 |
| Saltbush | 67·8 | 5·0 | 14·8 | 6·6 | ·7 | 5·1 | 2·6 | 10·1 | 4·1 | ·5 | 5·9 | 17·7 | 62 | 73 |
| Sheeps Burnett | 76·3 | 4·4 | 9·0 | 6·2 | ·7 | 3·4 | 2·5 | 6·1 | 3·8 | ·5 | 4·8 | 13·1 | 84 | 83 |
| Sweet potato vine | 85·6 | 2·0 | 6·3 | 2·8 | ·7 | 2·6 | 1·3 | 4·3 | 1·7 | ·5 | 5·5 | 8·3 | 133 | 146 |
| Silage— | | | | | | | | | | | | | | |
| Maize | 69·1 | 1·9 | 11·6 | 9·2 | ·5 | 2·7 | 1·0 | 7·8 | 6·5 | ·4 | 15·2 | 16·1 | 68 | 190 |
| Sorghum | 74·3 | 1·8 | 14·4 | 8·9 | ·4 | 2·2 | ·9 | 9·6 | 6·3 | ·3 | 18·4 | 17·4 | 53 | 211 |
| Wheat, thistles and mustard | 65·0 | 4·6 | 13·5 | 11·9 | 1·2 | 3·8 | 1·9 | 9·0 | 8·4 | ·9 | 10·2 | 21·2 | 52 | 100 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Roots, Tubers &c.— | | | | | | | | | | | | | | |
| Beets | 77·0 | 2·1 | 17·0 | 1·8 | ·1 | 2·0 | ·5 | 16·8 | 1·6 | ·1 | 37·2 | 19·1 | 58 | 380 |
| Cabbages | 90·5 | 2·4 | 3·8 | 1·5 | ·4 | 1·4 | 1·2 | 3·4 | 1·4 | ·4 | 4·8 | 6·8 | 162 | 158 |
| Mangolds | 87·5 | 1·6 | 7·1 | 1·4 | ·1 | 2·3 | ·6 | 6·5 | ·7 | ·1 | 12·4 | 8·0 | 138 | 317 |
| Potatoes | 75·5 | 2·1 | 20·2 | ·7 | ·2 | 1·3 | ·8 | 19·8 | ·4 | ·2 | 25·8 | 21·4 | 51 | 238 |
| Ditto, sweet | 71·1 | 1·5 | 24·7 | 1·3 | ·4 | 1·0 | ·6 | 24·2 | ·7 | ·3 | 42·6 | 26·1 | 42 | 317 |
| Pumpkins | 83·9 | 2·2 | 8·3 | 3·1 | ·9 | 1·6 | 1·1 | 7·0 | 2·6 | ·7 | 10·2 | 12·2 | 90 | 173 |
| Swedes | 86·0 | 2·0 | 9·4 | 1·3 | ·1 | 1·2 | ·4 | 8·9 | 1·2 | ·1 | 25·8 | 10·7 | 103 | 475 |
| Turnips | 89·5 | 2·7 | 5·2 | 1·4 | ·1 | 1·1 | ·6 | 4·9 | 1·3 | ·1 | 10·7 | 7·0 | 157 | 317 |
| *Dry Fodders*— | | | | | | | | | | | | | | |
| Hay and Straw— | | | | | | | | | | | | | | |
| Barley | 9·5 | 10·4 | 37·2 | 31·8 | 2·2 | 8·9 | 4·5 | 23·8 | 19·1 | 1·2 | 10·1 | 49·7 | 22 | 42 |
| Bush hay, good | 7·5 | 6·1 | 38·6 | 39·8 | 1·9 | 6·1 | 3·2 | 26·2 | 25·0 | 1·1 | 16·8 | 56·6 | 19 | 59 |
| Ditto, poor | 6·5 | 2·8 | 36·6 | 45·3 | 1·1 | 7·3 | 1·3 | 23·4 | 27·2 | ·6 | 40·0 | 53·2 | 21 | 146 |
| Canary grass | 9·0 | 15·2 | 40·2 | 26·0 | 2·1 | 7·5 | 6·1 | 25·7 | 15·6 | 1·1 | 7·2 | 49·3 | 22 | 31 |
| Cowpea chaff | 8·1 | 15·7 | 31·5 | 26·6 | 4·3 | 13·8 | 8·1 | 22·3 | 11·2 | 2·2 | 4·8 | 45·8 | 24 | 23 |
| Lucerne | 8·2 | 21·0 | 31·4 | 25·9 | 2·8 | 10·7 | 11·1 | 21·7 | 11·9 | 1·4 | 3·3 | 46·7 | 24 | 17 |
| Prairie grass | 9·0 | 16·9 | 32·6 | 28·2 | 3·0 | 10·3 | 6·9 | 20·8 | 16·9 | 1·7 | 6·0 | 47·8 | 23 | 28 |
| Straw, barley | 8·5 | 2·9 | 40·2 | 41·0 | ·8 | 6·6 | ·6 | 21·7 | 22·5 | ·3 | 74·8 | 45·4 | 24 | 317 |
| Ditto, Oats | 9·2 | 4·0 | 42·4 | 37·0 | 2·3 | 5·1 | 1·0 | 22·5 | 21·4 | ·9 | 46·0 | 46·9 | 23 | 190 |
| Ditto, Wheat | 7·6 | 2·5 | 42·2 | 39·3 | ·9 | 7·5 | ·5 | 16·4 | 21·6 | ·3 | 77·3 | 39·1 | 28 | 380 |
| Wheat hay | 8·3 | 10·7 | 33·6 | 37·6 | 2·0 | 7·8 | 4·2 | 21·5 | 22·6 | 1·1 | 11·1 | 50·4 | 22 | 45 |
| Grains, Seeds, &c.— | | | | | | | | | | | | | | |
| Barley | 10·9 | 12·4 | 69·8 | 2·7 | 1·8 | 2·4 | 8·7 | 64·2 | ·7 | 1·2 | 7·8 | 75·5 | 15 | 22 |
| Corn (maize) | 12·0 | 13·1 | 65·8 | 2·0 | 5·5 | 1·6 | 10·0 | 61·2 | 1·2 | 4·7 | 7·3 | 82·2 | 13 | 19 |
| Cowpeas | 14·8 | 20·8 | 55·7 | 4·1 | 1·4 | 3·2 | 17·3 | 52·0 | 1·1 | ·8 | 3·2 | 70·5 | 16 | 11 |
| Kaffir corn | 9·3 | 9·9 | 74·9 | 1·4 | 3·0 | 1·5 | 7·5 | 69·6 | ·8 | 2·6 | 10·1 | 83·1 | 13 | 25 |
| Linseed | 9·2 | 22·6 | 23·1 | 7·1 | 33·7 | 4·3 | 17·0 | 12·7 | 4·3 | 29·0 | 4·9 | 99·0 | 11 | 11 |
| Oats | 11·0 | 11·8 | 59·7 | 9·5 | 5·0 | 3·0 | 9·2 | 46·0 | 2·5 | 4·1 | 6·3 | 66·2 | 17 | 21 |
| Rice | 12·4 | 7·4 | 79·2 | ·2 | ·4 | ·4 | 4·6 | 73·1 | ·1 | ·4 | 16·1 | 78·3 | 14 | 41 |
| Sunflower seeds | 8·6 | 16·3 | 21·4 | 29·9 | 21·2 | 2·6 | 14·3 | 16·5 | 17·0 | 18·7 | 5·3 | 89·4 | 12 | 13 |
| Wheat, plump | 11·1 | 14·8 | 67·4 | 3·2 | 2·2 | 1·3 | 11·8 | 54·0 | 1·1 | 1·5 | 5·0 | 69·2 | 16 | 16 |
| Ditto, shrunk | 8·3 | 17·1 | 65·8 | 3·5 | 3·0 | 2·3 | 13·7 | 52·6 | 1·2 | 2·0 | 4·3 | 70·7 | 16 | 14 |
| By-Products— | | | | | | | | | | | | | | |
| Barley and malt combings | 15·1 | 11·2 | 64·0 | 5·3 | ·5 | 3·9 | 8·3 | 44·3 | 1·8 | ·5 | 5·6 | 54·7 | 20 | 23 |
| Bran | 11·9 | 15·4 | 53·9 | 9·0 | 4·0 | 5·8 | 11·0 | 34·5 | 1·6 | 1·8 | 3·6 | 50·1 | 22 | 17 |
| Brewers' grain, wet | 75·7 | 5·4 | 12·5 | 3·8 | 1·6 | 1·0 | 3·9 | 7·7 | 1·5 | 1·4 | 3·2 | 15·9 | 69 | 49 |
| Corn cobs | 8·4 | 2·5 | 54·7 | 32·0 | ·7 | 1·7 | ·5 | 26·3 | 18·3 | ·6 | 92·0 | 46·4 | 24 | 380 |
| Cotton seed meal | 9·9 | 47·3 | 22·5 | 3·2 | 12·2 | 4·9 | 39·0 | 13·5 | 1·8 | 11·3 | 1·0 | 76·4 | 14 | 5 |
| Linseed meal | 10·0 | 36·1 | 36·7 | 8·4 | 3·6 | 5·2 | 30·0 | 28·2 | 4·8 | 3·2 | 1·4 | 67·4 | 16 | 6 |
| Oilcake, sunlight | 9·5 | 19·2 | 47·4 | 7·0 | 11·2 | 5·7 | 15·6 | 38·6 | 4·0 | 10·4 | 4·3 | 80·6 | 14 | 12 |
| Peanut meal | 10·7 | 47·6 | 23·7 | 5·1 | 8·0 | 4·9 | 33·8 | 11·6 | ·6 | 7·2 | ·9 | 59·2 | 19 | 6 |
| Pollard | 10·0 | 17·4 | 58·0 | 5·2 | 5·6 | 3·8 | 13·9 | 47·0 | 1·7 | 4·8 | 4·3 | 72·2 | 15 | 14 |
| *Various Foods*— | | | | | | | | | | | | | | |
| Milk | 87·2 | 3·6 | 4·8 | .. | 3·7 | ·7 | 3·4 | 4·7 | .. | 3·7 | 3·9 | 16·3 | 68 | 56 |
| Ditto, skimmed | 90·4 | 3·8 | 5·0 | .. | ·1 | ·7 | 3·6 | 5·2 | .. | ·1 | 1·5 | 8·7 | 126 | 53 |
| Dried blood | 8·5 | 84·4 | .. | .. | 2·5 | 4·6 | 52·4 | .. | .. | 2·5 | ·1 | 52·9 | 21 | 36 |
| Molasses | 24·0 | 2·2 | 63·8 | .. | .. | 10·0 | .. | 57·5 | .. | .. | .. | 58·5 | 19 | .. |

## DEPARTMENT OF AGRICULTURE AND STOCK.

### CORN-GROWING COMPETITION, 1915-16.

1. This competition will be open to all under the age of eighteen years who are residents of the State of Queensland. An entrance fee of 2s. 6d. must be forwarded to the Under Secretary with the application to enter.

2. Applications to be enrolled in the competition, containing the following particulars, must reach the Under Secretary, Department of Agriculture and Stock, Brisbane, not later than 12 noon on the 30th September, 1915:—

(*a*) Full name and address. (Give Christian names in full.)
(*b*) Date of birth. (Day, month, and year.)
(*c*) No. of Division in which applicant resides, and the name of the Dairy Inspector who supervises the locality.

3. The area to be devoted to the planting of the seed maize shall be one-tenth of an acre, selected seed for which will be supplied free of cost; but one parcel only will be supplied to each competitor during the period of the competition.

4. Each competitor shall have absolute freedom in his choice of ground, and in the methods he may adopt in preparing, planting, and cultivating his plot; but in no case shall a plot exceed one-tenth of an acre, otherwise disqualification will be incurred.

The following table shows the length the rows must be to give the exact area according as four, five, six, or more rows are planted:—

| No. of Rows 4 feet apart. | Length of Rows in Feet. | No. of Rows 4 ft. apart. | Length of Rows in Feet. |
|---|---|---|---|
| 4 | 272 ft. 3 ins. | 8 | 136 ft. 1½ ins. |
| 5 | 217 ft. 10 ins. | 12 | 90 ft. 9 ins. |
| 6 | 181 ft. 6 ins. | 16 | 68 ft. |
| 7 | 155 ft. 7 ins. | | |

5. Each competitor will be required to keep a record chart showing the dates and particulars of the different stages of work, and these charts are to be delivered, at the time of harvesting, to the officer appointed for superintending and verifying the yield.

6. Within seven days from the verification of the yield from the crop, each competitor shall select, without aid from other persons, twelve cobs of the maize from his crop, and forward them to the Department of Agriculture and Stock, Brisbane. Labels for this purpose will be supplied.

7. Competitors must notify the Dairy Inspector for the district of the date when the crop shall have matured and be ready for inspection.

8. No competitor shall be allowed to employ or permit any labour upon the competition plot standing in his name, other than his own personal labour, excepting in relation to the driving of horses, for which, owing to circumstances, such help may be needed.

9. The competition will close on the 30th June, 1916, and the prizes will be allotted thus:—

The competitors will be grouped according to the following divisions:—

(1) The district supervised by—
Mr. S. A. Clayton, Dairy Inspector, Beenleigh.
Mr. H. C. Gordon, Dairy Inspector, Harrisville.
Mr. D. J. Binnie, Dairy Inspector, Rosewood.

(2) The district supervised by—
Mr. C. C. Pickering, Dairy Inspector, care of Mr. D. Macpherson, Montague road, South Brisbane.
Mr. R. G. Ridgway, Dairy Inspector, Ellerslie Crescent, Taringa, Brisbane.
Mr. R. Winks, Dairy Inspector, Gympie.
Mr. F. J. Watson, Dairy Inspector, Bundaberg.
Mr. W. S. Harding, Dairy Inspector, Esk.

(3) The district supervised by—
Mr. J. H. Barber, Dairy Inspector, Crow's Nest.
Mr. J. P. Carey, Dairy Inspector, Gatton.

(4) The district supervised by Mr. W. Hartley, Dairy Inspector, Nanango.

(5) The district supervised by—
Mr. J. J. Carew, Dairy Inspector, Russell street, Toowoomba.
Mr. L. Verney, Dairy Inspector, Newtown, Toowoomba.
Mr. J. R. D. Munro, Dairy Inspector, Warwick.

(6) The district supervised by Mr. C. Queale, Dairy Inspector, Gayndah.

(7) The district supervised by—
Mr. J. Cattanach, Dairy Inspector, Dalby.
Mr. R. S. Sigley, Dairy Inspector, Roma.
Mr. W. R. Holmes, Dairy Inspector, Goondiwindi.

(8) The Central district of Queensland, including that supervised by Mr. H. T. Deighton, Dairy Inspector, Rockhampton.

(9) The Northern district of Queensland, including that supervised by—

Mr. E. C. Lake, Dairy Inspector, Mackay.

Mr. H. C. Colledge, Dairy Inspector, Atherton.

If there are more than ten competitors in any division, three prizes will be awarded for competition in that division; less than ten competitors, one prize only.

The prizes shall be of the following value:—First, £5; second, £2; third, £1.

No money prizes will be given, but each successful competitor will be allowed to select some article to the value of his prize.

The prizes awarded in any division may be increased in number and value by donations from persons, firms, or societies who may be interested in the competition.

10. Three special prizes of the value of £10, £5, and £3 will be awarded to the competitors who stand first, second, and third in the entire competition.

These prizes may be increased in number and value in the same way as indicated above in connection with the divisional competitions.

No prize will be awarded unless the yield of corn equals 20 bushels per acre. This stipulation may be waived under very exceptional circumstances in the case of a lower yield.

11. The aggregate points will be 100, and the judging will be based upon the following:—

(*a*) Quality of the maize produced.

(*b*) Yield of plot.

(*c*) Notes and records of plot.

12. The Director of Agriculture will be the sole judge of the competition, and his decision shall be final.

WILLIAM LENNON,
Secretary for Agriculture and Stock.

Brisbane, 30th July, 1915.

# EXHIBITION NOTES, 1915.

## DISTRICT EXHIBITS.

The Council of the National Association must be heartily congratulated on the gratifying results which have attended the Exhibition at Bowen Park in August, 1915, notwithstanding the great handicap of the breaking out of the European war, with its heavy calls, not only on the purses of the public throughout the State, but on some thousands of the flower of the young men of the towns and of the country districts, who in past years of peace have flocked every year to the metropolis to enjoy a week's holiday and, incidentally, to expend large sums in various ways during the national carnival. These patriotic men, as well as women, who have nobly gone to the front, will have doubtless been recalling memories of their enjoyment of the Exhibitions of previous years, whilst patriotically and cheerfully undergoing the dangers and privations to which they, to their eternal honour, have subjected themselves.

The severe drought conditions which prevailed for months prior to the Show date also contributed to the difficulties so ably overcome by the Association.

The value of the work of the Association consists not merely in the amount of money taken at the gates and otherwise, but in its effects in bringing together people from all parts of the Commonwealth, as well as many from oversea, thus advertising far and wide the great resources of this most resourceful of all the States of Australasia. The general public is naturally unaware of the great volume of business transacted during and after the Show, as a direct consequence of the advantages offered to business men, and to buyers and sellers generally, by personal inspection of the exhibits and personal communication with agents. Thus, as an advertising medium, irrespective of its value from an educative point of view, the National Association's Exhibition is of primary importance, and fulfils a purpose which it would be impossible to attain in any other way. Space will not admit of our giving a comprehensive description of the multifarious exhibits in this Journal. This we leave to the enterprise of the metropolitan and country journals, confining ourselves to special salient points in connection with them.

During the past year the Association had to deplore the demise of the late Secretary, Mr. Arvier, to whose energy and enthusiasm was due the success attending many previous Shows. His successor, Mr. J. Bain, has already given evidence of good organising ability, and his energy will doubtless be instrumental in building further success on the solid foundation laid by his predecessor. The position of Secretary to an important Association such as this one demands much tact and firmness, at Show time especially, when one has to remember the quotation

so very appropriate to the occasion—"*Tot homines, quot sententiæ,*" which, being interpreted, implies that where there are many gathered together, there will be as many different opinions.

In connection with the exhibits, those coming under the head of "District Exhibits" deserve special mention. Of late years they have formed a very distinctive feature of the annual Exhibition, and are especially valuable in educating the people in respect of the various products and industries of Northern, Southern, Central, and Western Queensland, of the tablelands and plains and coastal areas, which embrace tropical, sub-tropical, and temperate districts of a State covering an area of nearly 700,000 square miles. It is owing to the vast distances which separate these from each other, that little would be known of the products and possibilities of particular districts, were it not for the bringing together of these districts by means of the National Association's Exhibitions.

The very attractive District Exhibits, therefore, deserve special mention, forming, as they do, a distinctive feature of the Exhibition, as before stated. In times past, the Moreton District exhibit has been very successful in taking first place amongst these important exhibits. It was in 1906 that Moreton and Wide Bay and Burnett tied, and Moreton won the Chelmsford Shield in the following year. The latter district was also successful at the Bowen Park Shows of 1903, 1904, 1905, tying with Wide Bay and Burnett in 1906.

In 1907, Moreton decided to rest on its laurels and stand out in 1908. This was much to be deplored, although it was certainly magnanimous of the Moreton men. Still, it was considered that every district throughout the State should put forth its best endeavour to show what its resources are, and, win or lose, there will always be the satisfactory consciousness of having done something for the dissemination of a knowledge, or a dissipation of the crass ignorance existing in some quarters of the grand resources of this "Queenly State."

In 1908, other districts determined to wrest the laurels from the men of Moreton, and they gradually crept up, and the Central District was successful in that year.

In 1909 the honours went to Wide Bay and Burnett.

In 1910 a new departure was made by the Council of the Association, no general districts, as a whole, being represented, but their place was taken by what was termed "One Farm Exhibits." Probably more interest was taken in these than in the former classes. The object was to show what could be done by individual farmers. No district was ransacked to obtain every conceivable product, from a pincushion to a pumpkin, from a horseshoe to an engine, but everything shown was absolutely produced on the competing farms by the farmer and his family.

The result of this decision fully justified the new departure, and seven entries represented the first struggle. Under the caption "One Farm Exhibit," we have given all the information on these, as well as

Plate 6.—Display of Tropical Products, Departmental Court (Agriculture and Stock), National Association Show, Brisbane, 1915.

we know, up to the present date. It will be interesting to recall the words of the Hon. W. Kidston, then Premier of Queensland, on the subject of "District Exhibits," at the luncheon on the opening day of the Exhibition of 1906. He said, *inter alia*:—"The thing that struck him most about the annual Exhibition was its truly national character. The district exhibits were an admirable feature of the Show, and the competition was excellent from a national point of view. A personal patriotism was shown in the exhibit of articles for the sake of the district. It was an exceedingly healthy and profitable spirit to inculcate. . . . They needed to educate their own people in the possibilities of their own country, and if they could develop the district competition sufficiently, they might be able, not only to educate their own people, but to get together products from all parts of Queensland which would be worth sending to the old country. He was certain that, if the display was really worthy of the industries and production of Queensland, it would not only open the eyes of many Queenslanders, but would open the eyes of the people in the old country as to the value and possibilities of Queensland." This was putting all we have said and written in the past on the subject in a nutshell, tersely, and to the point, and verily the honourable gentleman unconsciously spoke prophetically, seeing that what he suggested as a possibility has become a reality, Queensland's products and industries having long since been exhibited in the old country, on the Continent of Europe, and now in San Francisco.

This year the Northern Rivers of New South Wales, the Western districts, and the Thera district of the same State were grouped under the title of

## THE "A" GRADE.

### Western Districts (N.S.W.).

Last year the Western districts competed in this section, and the extent of the exhibits may be accounted for by the fact that the district comprises such centres as Bathurst, Dubbo, Mudgee, Orange, Lithgow, Wellington, and Blaney. The exhibits comprise 100 fleeces of wool both of the pure merino and its crossbreeds. As might be expected, wheat figures largely, as do hay and chaff, maize, grasses, tobacco, whilst it would seem impossible to present more magnificent apples, pears, peaches, and oranges than those grown at Dubbo. Marble from the Bathurst quarries (much used throughout the Commonwealth) attracted considerable attention. Dairy products were also in evidence, especially Cheddar cheese made at the Byalong Cheese Factory.

### Northern Rivers (N.S.W.).

The Northern Rivers of New South Wales and their products are better known to Queenslanders than the Western districts of that State, owing to their proximity to the Southern districts of Queensland, and to the fact that it has long been acknowledged that Brisbane is the natural outlet for the products of those fertile districts and that only the construction of a short line of railway is needed to connect them with the Southern Queensland railway system. Most of the exhibits came from

the Tweed, Richmond, and Clarence Rivers, and the display was arranged by the North Coast Agricultural Shows' Association. Byron Bay and Ramornie were well to the front with dairy produce, swine products, and canned meats. Farm products, honey, jams, pickles, &c., were all largely represented and excellent of their kind. Sugar-cane, being grown to some considerable extent on the Tweed River, was well to the fore, and citrus and many tropical fruits were largely in evidence, proving that the climate and soil of the Rivers are much akin to those of Southern Queensland.

### South Coast, Queensland.

It was gratifying, of course, to Queenslanders that the South Coast exhibit succeeded in carrying off the first prize in the "A" Grade. Six years have elapsed since the district, under the name of the Logan, appeared as a competitor at the Bowen Park Show. To-day the South Coast includes in its extensive area some of the finest agricultural, dairying, and fruit-growing soils in the State, nearly all of which had large areas under sugar-cane in the old days of sugar-growing in the State. These are Cleveland, Redland Bay, Ormiston, Beenleigh, Coomera, Nerang, Pimpama (Ormeau), and Yatala. Other non-sugar districts were Manly, Springbrook, Tabragalba, Beaudesert, &c. The exhibits comprised many varieties of sugar-cane, sugar raw and refined, cereals, potatoes, root crops, hay, grasses, fruits, and a vast variety of timber, besides multifarious products of the farm, women's industries, &c. Dairy products, hams, bacon, &c., were well to the fore. The exhibits were displayed to the greatest advantage.

## "B" GRADE.

### Gympie.

The Gympie exhibit was an "eye-opener" to many whose only idea of Gympie has hitherto been that the district is only devoted to gold-mining. Included therein is part of the celebrated Blackall Range, now so well-known for its magnificent scrub soils, hundreds of acres of which have long since been producing fortune-making crops of citrus fruits, pineapples, bananas, &c., beside ordinary farm and dairy products. Yandina, the Maroochy, Cooroy, &c., all districts producing splendid timbers, fruits, farm and dairy produce, &c., besides sugar-cane and sugar, of all of which there were splendid samples, especially of the magnificent kauri pine of Kin Kin, Lake Cootharaba. Gold specimens there were, of course, but the products of the soil were pre-eminent. Of the prize money allotted to "B" Grade exhibitors Gympie took the largest share.

### Murgon, Wondai, and Tingoora.

combined to make a very excellent display of the products of the Southern Burnett District. The above three districts are on the Maryborough-Nanango line. The exhibits, tastefully arranged, comprised a great variety of farm products, such as maize, potatoes, hay and chaff of various kinds, broom millet, sugar-cane, natural and artificial grasses. From the Murgon factory came the butter, from Goomeri the cheese,

from Wondai a fine sample of joinery work. The fruit section was well represented by citrus fruits, bananas, apples, &c. This was quite a typical display of the agricultural products of the Burnett. There was a wonderful exhibit of the industry of the ladies in the shape of those comestibles of which our ancestral mothers were so proud—namely, jams, jellies, preserved fruits, pickles, cakes, and confectionery. It was stated that some 400 varieties were tabled. Then there was a quantity of various kinds of needlework, embroidery, and other delicate confections, which added greatly to the attractions of the exhibit.

### LOCKYER.

The Lockyer is essentially an agricultural district, and its varied products have always been conspicuous at our annual Exhibition at Bowen Park. How the varied excellent specimens of field produce shown have been produced in the face of the exceptionally dry season is not easily explainable, but there they were, and as fine as if there had been a plentiful rainfall, or grown under irrigation. The Laidley and Gatton districts have long been famous for their heavy lucerne and potato crops, and both grasses and potatoes, as well as sweet potatoes and maize, were in perfect condition. Vegetables, especially cabbages and cauliflowers, were in profusion, and a useful exhibit was that of varieties of farm seeds. Honey appears to be a specialty of the district, and the exhibitors were in hopes of repeating their success in obtaining a special prize for this product as in 1914. The numerous butter and bacon factories in the district were well represented by their butter, cheese, hams, and bacon. Farm-made butter of excellence was also to be found in this section. There were three exhibits of what may be called neglected industries of Queensland, although all grow to perfection in the district, and would produce heavy crops. These were sisal hemp, tan barks, and cotton, and fabrics from sisal and cotton fibre were shown. Neither is silk wanting, and this is another neglected industry which does not appeal to the Queensland farmer or his family. Stone from the Helidon quarries, ready dressed for the builder, and soft woolly fleeces represented two important industries. And then came the samples of woman's deft work, in the shape of comestibles and needlework, destined to vie with the same subjects in all the other district exhibits. The Lockyer was a display worth visiting.

### KINGAROY.

This exhibit, which was organised by the Agricultural, Pastoral, and Industrial Society, properly represented the resources of the South Burnett, in the same direction as did Wondai, seeing that the two districts are conterminous. Amongst the agricultural exhibits were to be seen very fine onions of several distinct varieties, including tree and pickling onions, leeks, and eschalots. There was a very fine wool trophy, and an exhibit of hides and tanned pelts. A very useful lesson was afforded by a plot set out with various grasses and samples of the soils of the district. This is of more importance than most people are aware of, seeing that frequently, when an intending selector wishes to settle in any particular district, his first inquiry is as to the nature of

the soil; and the exhibition of the soils and subsoils of the locality might often decide the inquirer as to whether such or such country would be suitable for him.

### Crow's Nest.

Crow's Nest is a very fertile district only 34 miles from Toowoomba, and is very strong in the production of cereals, potatoes, pumpkins, chaff, grasses, vegetables, timbers. The samples of these were certainly very commendable, especially those of all the best-known and most profitable varieties of maize. The same may be said of the wheat exhibits, comprising Gluyas, Bunge, and others raised from seed from the wheat experiment State Farm, Bungeworgorai, Roma. It was at Geham, on the Crow's Nest branch railway line (15 miles from Crow's Nest), that the corn grown by H. W. Abel won a £2 prize, also a special prize of £3, and N. S. Smoothy, of Pinelands, Crow's Nest, won the district prize of £5, as well as a special prize of £5, in the corn-growing competition of 1914-15, held by the Department of Agriculture and Stock, when there were sixty-two entries by Darling Downs lads. His good work yielded at the rate of 82 bushels per acre, and F. Franke, of Cawdor, on the same line, raised 76 bushels per acre, also being a prize-taker. These examples go far to show the adaptability of the Crow's Nest soil and climate for maize-growing. It should be stated that the abovenamed young farmers were aged, respectively, fourteen and fifteen years.

Lucerne, Rhodes grass, and panicum appear to thrive well in the district, and the mangolds could scarcely be beaten anywhere for size and weight of crop per acre. The timbers were shown in the rough, and in the polished and unpolished state. The dairying industry, as elsewhere on the Darling Downs, was well represented, and the exhibits were interspersed with the many varieties of preserves, and other useful and delicate articles, the work of the ladies of the households.

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Mr. John Macdonald (chairman of the National Association Council) presided at the annual informal meeting of those connected with the district and one-farm displays. Messrs. John Reid, A. W. Cameron (council stewards), and J. Bain (secretary) were also present, and there was a good attendance of the workers in connection with the different exhibits.

The chairman said he was glad to once again meet the district exhibitors. The National Association duly appreciated the work done in that section of the annual Exhibition, and in every way possible endeavoured to encourage them to come each year, for the council recognised that such displays were an object lesson as to the fertility of the soil and the high quality of the primary products of the State. The work of arranging these displays, he thought, was of considerable magnitude, but he was pleased to see that progress was being shown all round. Never had there been retrogression during the twenty years the district exhibits had been displayed in the Exhibition. He thanked all for their very hard work. During the previous year the Association spent no less a sum than £2,000 on these district displays, so that the

PLATE 7.—DEPARTMENTAL COURT (AGRICULTURE AND STOCK), CENTRAL DISPLAY FROM STATE FARMS AND EXPERIMENTAL PLOTS, NATIONAL ASSOCIATION SHOW, BRISBANE, 1915.

public understand that the Council was thoroughly alive to the fine advertisement Queensland secured through these collections of exhibits. Considering every aspect of the case, it was decided this year to give each of the "A" Grade districts a bonus of £20, and to increase the prize money in the "B" Grade by £50. The altered prize money was as follows:—"A" Grade: South Coast, £130; Western Districts, N.S.W., £105; Northern Rivers, N.S.W., £75. "B" Grade: Gympie, £73 18s.; Lockyer, £73; Kingaroy, £69 1s.; Wondai, Murgon, and Tingoora, £68; Crow's Nest, £66 1s. One-farm displays: O. C. Williams, £54 8s. 9d.; T. Nystrom, £45 11s. 3d. He sympathised with Mr. Trevitt, manager of the Western districts, in having met with an accident.

Mr. John Reid said the district exhibits had greatly improved during the last few years, and now they had been brought to the highest plane. He trusted that next year more "A" Grade districts would compete. The whole display had been astonishing, not only to the council but also to the public who visited the show.

Mr. A. W. Cameron said that arranging district displays had now become a science. Many small details required their consideration. They always endeavoured to secure the very best judges available for the work, but if there had been any errors of judgment it was no fault of the association. He trusted that all present would help at the next Exhibition, and encourage other districts to enter into the competition.

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## DEPARTMENT OF AGRICULTURE AND STOCK.

As in former years, that portion of the Exhibition building devoted to the exhibits of the Department of Agriculture was nicely arranged, and set forth to the best advantage the multifarious products of the State, which include those of the torrid, sub-tropical, and temperate zones. Even a cursory inspection of the exhibits of the different branches of the Department must convince the stranger that Queensland is a most desirable State to select for a home. In this section, as also in the District sections, may be seen practical proofs of the extraordinary resources of the country, as well in climate, rainfall, and soil, as in the vast areas of land open to selectors. All the trophies and displays here have been arranged, not only with a view to spectacular effect, but rather with the the idea of making everything in the section serve an educational and instructive purpose. The different sections and trophies, illustrating the Department's activities, were, as described in the "Brisbane Courier":—

Sheep and wool, stock experiment station, botanical division (weeds and suspected poisonous plants, and native grasses), division of entomology and vegetable pathology, pure seeds display from the seed-testing branch, combined seed-corn and corn-growing display, exhibit of saccharine and non-saccharine drought-resistant sorghums, broom millet (educational display), tropical products, tobacco (pipe, cigar, cigarette), fibres (including cotton), hay, chaffs, and fodders, vegetables (including special display of imported potatoes, grown at the Agricultural College,

PLATE 8.—EXHIBIT OF SACCHARINE AND NON-SACCHARINE SORGHUMS (DEPARTMENTAL COURT, AGRICULTURE AND STOCK) NATIONAL ASSOCIATION SHOW, BRISBANE, 1915.

Gatton), Roma State Farm wheat and wheat-breeding display, various products from the Agricultural College, wheat, maize, sorghums, and fodders from field experiment plots, cereals and fodders from Warren and Hermitage State Farms, trophy of typical Queensland fruits (temperate and sub-tropical), Gordo Blanco raisins from Roma State Farm, farm and garden seeds, samples of seed wheat distributed to farmers under the 1915 wheat extension scheme, and photographs illustrating the State's primary industries.

The seed-testing branch exhibit includes a collection of seeds, comprising not only such well-known kinds as lucerne, prairie, oats, &c., but the samples as often sold to the seed trade, and the same after cleaning and grading preparatory to resale. All buyers of agricultural seeds are not as yet fully aware of the working of the Pure Seeds Act, and the seed-testing branch has been established so that they may guard against sowing seeds of low quality. Any purchaser may send samples to the branch to be tested for purity and germination. If a buyer insists on a low price he is practically insisting on low quality. One sample of Algerian seed oats, the sale of which was stopped by the Department, contained 46·48 per cent. of impurities (14·16 Star Thistle, 12·06 barley, 18·33 darnel or drake, 1·93 other impurities.) The cleanings from lucerne and prairie grass are object lessons as to the value of recleaned and graded samples. The samples of weed seeds—the dodder, darnel, star thistle, wild radish, and several others—were taken from the bulks of seed offered for sale. The system of testing adopted by the seed branch, after very carfeul investigation of the methods used in London, Paris, Copenhagen, Zurich, and Wageningen, may be briefly described as follows:—Purity tests: In testing for purity only foreign seeds, and foreign matter such as sand, stalks, &c., are treated as impurities. Germination tests: All seeds of the species to which the sample purports to belong are included without reference to their condition of maturity (immature seeds and seeds without kernel are retained as pure seeds). Check tests are made of every sample. The "Tissot" method, by germinating the seeds on damp flannel, and by the "Simplicitas method," germinating the seeds in sand, on porous blocks; both of these systems are demonstrated in the exhibit.

Soil Exhibit.—Soils from some of the most important and characteristic farming districts of the State were collected, the soil being taken to a depth of 2 ft., and are exhibited in specially made glass columns. The soils represent some of our fertile lands, many of which have been under cultivation for a great number of years. There are sugar-cane soils from Mulgrave, Mackay, and Bundaberg; wheat soils from Miles, Roma, and Westbrook; maize soils from Kingaroy, Beaudesert, and Tallegalla; lucerne soils from Murgon and Rosewood; potato soils from Beenleigh, Goombungee, and Lockyer. The collection also includes a soil from Buderim Mountains, well known for its excellent bananas; a soil from the Stanthorpe district, particularly suitable for stone fruit; particularly rich fertile soils from the Bowen district, suitable for citrus fruit and tobacco culture; a typical soil of good grazing

country from Westwood. A printed card gives for each soil a short description of the locality and the crops chiefly grown. The mechanical compositions with regard to the amount of sand, silt, and clay are given, followed by the chemical composition, showing how much of the important plant foods—nitrogen, potash, lime, and phosphoric acid—the soil contains in percentage, and also expressed in lb. per acre to a depth of 12 in.

Seed Corn and Corn-growing Display.—Three descriptive features are represented. Firstly, a collection of seed maize grown at the various departmental propagation plots, originating from grain imported from the United States of America. Systematic attention has been given to seed selection by field officers of the Department, and the produce from the plots is sold to farmers, who in this way have the opportunity of securing approved strains of seed. This season's orders have already absorbed all available stocks. The second feature comprises an educational exhibit, dealing in a comprehensive way with several types of maize. Typical ears of different stud varieties are shown in groups and in glass cases. Special attention has been given to the points governing seed selection in the field and barn, and concise information is furnished on descriptive cards and labels in such a way that anyone may become readily acquainted with the subject. The third section illustrates the final results of the recent corn-growing competition under eighteen years of age. Tabulated returns, prizes, and award cards are displayed in close proximity to the exhibits, which are arranged into groups representing nine different divisions of the State.

Sorghum Trophy.—The seed heads and seed of a number of saccharine and non-saccharine sorghums aggregating ten different kinds are displayed on a large trophy, to effectively present the different characteristics of each. The chief value of this exhibit lies in the fact that the non-saccharine kinds were imported from the United States, where they had established a reputation for drought-resistance. The Department has advertised seeds of respective kinds for sale, and already sufficient orders have been received to absorb all the stocks in hand. It is expected that during the coming season over 300 acres will be placed under crop from the seed so distributed.

Broom Millet Display.—The high price of well-graded and well-prepared fibre (from £37 to £40 per ton in Brisbane) indicates there is good money in this commodity. It is customary for growers to pay somewhat too limited attention to the grading, classing, and baling of the fibre for market. The different samples of fibre and articles in process of manufacture are arranged to serve as a guide for the grower when harvesting and preparing his crop for market, as so much depends on proper preparation and get-up.

Wheat.—In the general display of sheaves of wheat and grain the collection of new crossbred and named varieties of wheat from the Roma State farm are prominent. The bright attractive straws and prolific types of ear generally to be noted indicate that good progress is being made with the development of new varieties. A collection of over

Plate 9.—A Section of the Wall Display in the Court of the Department of Agriculture and Stock, National Association Show, Brisbane, 1915.

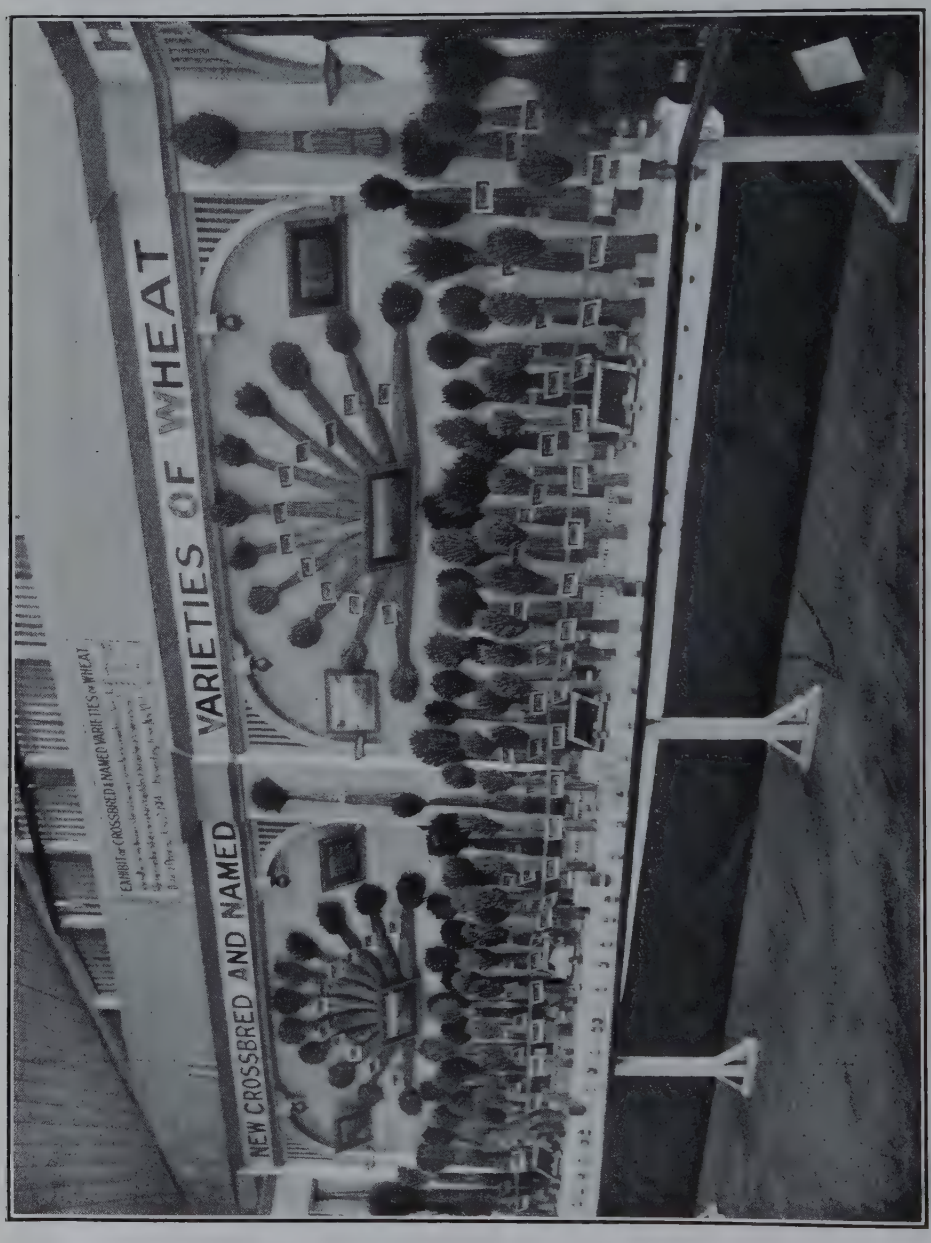


PLATE 10.—SECTION OF THE WHEAT EXHIBIT, DEPARTMENTAL COURT (AGRICULTURE AND STOCK), NATIONAL.

Plate 11.—Display of Wools, Departmental Court (Agriculture and Stock), National Association Show, Brisbane, 1915.

fifty varieties raised at one of the field experimental plots in the Goondiwindi district shows conclusively what this tract of country is capable of producing. In this lot representative Canadian, Indian, Roma, and Southern wheats predominate, and it is interesting to note that a variety known as Pusa No. 12, which is reported to have given such excellent results in India, has also shown out prominently here in relation to its field characteristics.

Wool.—The wool exhibit this year takes a different form from that of other years, and has been arranged for instructional purposes in keeping with the character of this branch of departmental work, as well as to illustrate the perfection which the State has attained in the production of a wide range of notable wools and of different sheep breeds and their crosses. The success of Queensland in this particular section at the Panama Exposition shows that this State can hold its own with any other part of the Commonwealth in the matter of growing high-class wools of all kinds, including British breeds and crossbreds. In regard to the introduction of sheep on coastal areas, the show of British breeds, while not as complete as could be wished, contains good examples of such wools as are produced by the Border Leicester and Romney Marsh breeds. These breeds, so far, have done remarkably well under coastal conditions, and farmers may see the class of wool grown by each of these. The business of growing sheep on the coast is comparatively new, and other varieties may show up just as well as those named in the future, but at present it may be said that these two—Border Leicester and Romney Marsh—do very well. The examples shown are nearly all Queensland grown. One illustrative exhibit is that of a selection of Corriedale wools bred in the Longreach district by Mr. G. C. Greenwood, of Tocal. This example shows that long wools and crossbreds may be bred successfully in the hot West as well as on the coast and the Downs. Other examples show pure Lincoln, Leicester, Border Leicester, Dorset Horn, and Romney Marsh, with their various crosses. There is also a fairly representative selection of merino fleeces of much the same quality as those which gained the gold medal at the Panama Exposition recently. A small exhibit of mohair, Queensland bred, at Miles, by Mr. E. Scammell, is worth inspection.

## ONE-FARM EXHIBITS.

There were three entries in this section, the competitors being Messrs. O. C. Williams (Plainby), J. A. Nystrom, Booie, Kingaroy, and Mr. G. Trevitt (Bathurst, New South Wales). On previous occasions—1911 and 1913—the winners were, respectively, Messrs. Allen Bros. of Gympie, who secured a £200 prize (1911), and Mr. H. Franke, of Cawdor (1913).

Of the three competitors at the Exhibition of August, 1915, one had the misfortune to drop out owing to an unfortunate injury to the hand sustained by Mr. G. Trevitt, of Bathurst, New South Wales, through a fall from a ladder. On these exhibits, one of the judges, Mr. C. Siemon, said a lot of time and labour had been expended by both exhibitors, and their displays were a credit to their respective districts, and more so to their own farms. The agricultural products were a

PLATE 12.—O. C. WILLIAMS'S ONE-FARM EXHIBIT AT THE NATIONAL ASSOCIATION SHOW, BOWEN PARK, AUGUST, 1915.

PLATE 13.—EXHIBIT FROM YEERONGPILLY STOCK EXPERIMENT STATION, DEPARTMENTAL COURT (AGRICULTURE AND STOCK), NATIONAL ASSOCIATION SHOW, BRISBANE, 1915.

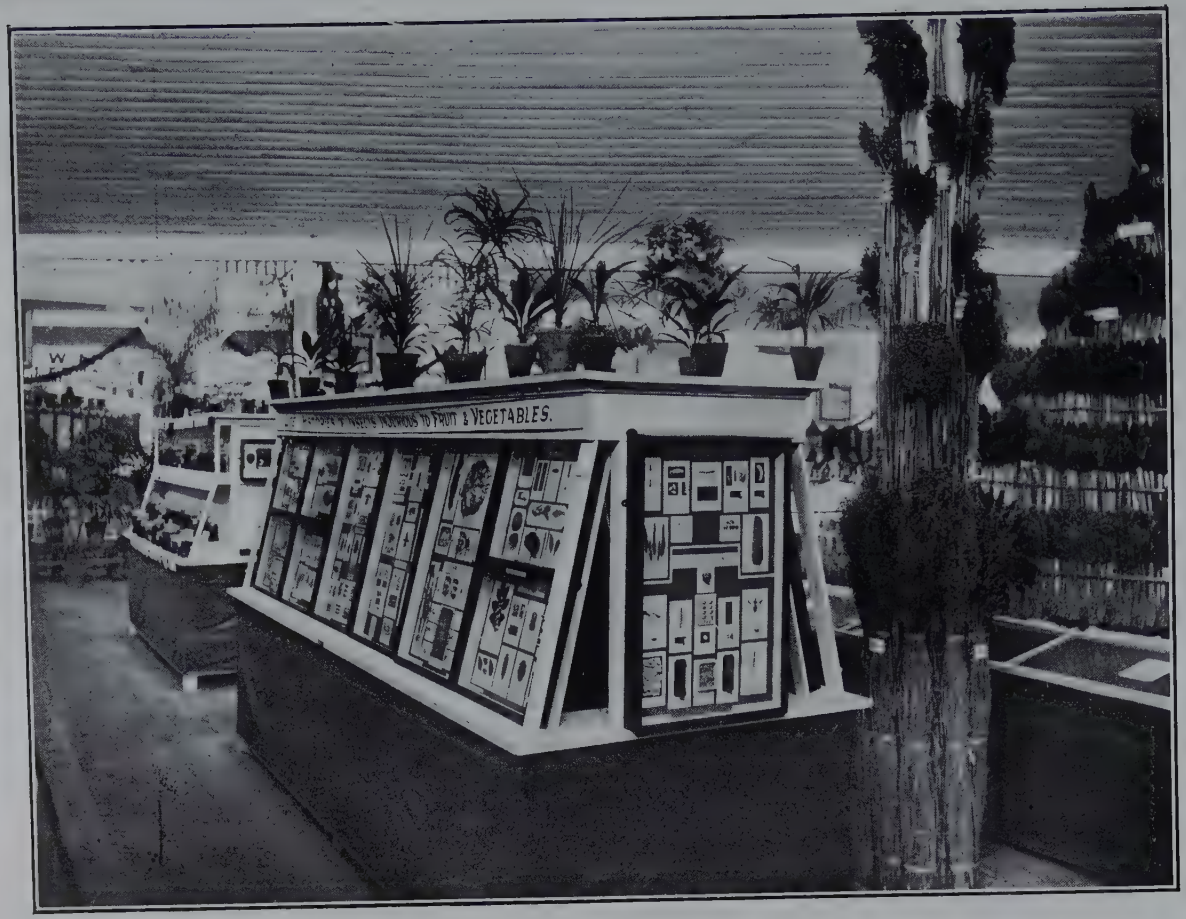


PLATE 14.—DEPARTMENTAL COURT (AGRICULTURE AND STOCK), ENTOMOLOGICAL AND VEGETABLE PATHOLOGICAL EXHIBITS, NATIONAL ASSOCIATION SHOW, BRISBANE, 1915.

splendid feature of each competitor's exhibit. The hays, chaffs, and grains forming part of the exhibits were very fine. Another prominent feature in each man's display was the excellent collection of preserves, jams, &c. The vegetable section in each was very poorly represented. The home work by the lady members of Mr. Williams's household was a credit to them. Mr. Williams's labour and time-saving implements used in connection with the work on his farm showed much ingenuity. Mr. J. Fenton, another of the judges, acquiesced with his colleague's remarks. Mr. Williams beat Mr. Nystrom by 57 points.

The following were the points awarded:—

| | Possible. | Nystrom. | Williams. |
|---|---|---|---|
| 1. Dairy Produce— | | | |
| Butter, 6 lb... | 25 | 18 | 15 |
| Cheese, one large or two small | 20 | 18 | 19 |
| Eggs, one dozen | 5 | 3 | 4 |
| | 50 | 39 | 38 |
| 2. Foods— | | | |
| Hams, 15 lb.; bacon, 15 lb. | 20 | 10 | 15 |
| Corned, smoked, and spiced beef and mutton, 10 lb. | 10 | 5 | 6 |
| Honey, 12 lb. | 10 | 7 | 7 |
| Beeswax, 6 lb. | 5 | 3 | 3 |
| Bread, 2 loaves; scones, 1 dozen | 5 | 3 | 4 |
| Confectionery and sweets, 3 lb. | 5 | 2 | 5 |
| Lard, tallow, and oils | 5 | 2 | 4 |
| | 60 | 32 | 44 |
| 3. Fruits, vegetables, and roots, fresh and preserved— | | | |
| Fresh fruit, all kinds | 25 | 15 | 10 |
| Dried fruits | 10 | 6 | 4 |
| Preserved fruits and jams | 15 | 10 | 14 |
| Fresh vegetables | 15 | 7 | 10 |
| Pickles, sauces, &c... | 15 | 10 | 12 |
| Potatoes (56 lb.), or a collection, and roots | 25 | 18 | 15 |
| Table pumpkins, squashes, and marrows, 56 lb. | 10 | 6 | 6 |
| Cocoanuts and nuts | 3 | 2 | 2 |
| Vegetable and garden seeds, 5 lb. | 5 | 3 | 4 |
| Arrowroot, 10 lb. | 5 | 3 | 3 |
| Cassava, 3 lb. | 5 | .. | .. |
| Ginger, 3 lb. | 5 | .. | .. |
| Sugar beet, 3 lb. | 5 | 3 | 3 |
| | 143 | 83 | 83 |
| 4. Grain, &c.— | | | |
| Wheat | 25 | 18 | 14 |
| Maize | 20 | 16 | 14 |
| Barley | 10 | 7 | 6 |
| Oats, rye, and rice | 15 | 10 | 10 |
| | 70 | 51 | 44 |
| 5. Tropical Products— | | | |
| Sugar-cane, 24 stalks or 1 stool | 30 | .. | .. |
| Cotton, in seed, 10 lb., long staple | 10 | 8 | 1 |
| Coffee, 10 lb. | 15 | .. | .. |
| | 55 | 8 | 1 |
| 6. Tobacco— | | | |
| Tobacco, leaf, dried, 5 lb. | 10 | .. | 4 |
| | 10 | .. | 4 |

| | Possible. | Nystrom. | Williams. |
|---|---|---|---|
| 7. Hay, Chaff, &c.— | | | |
| Hay, oaten, wheaten, lucerne, and other varieties | 20 | 8 | 17 |
| Grasses and their seeds, including canary | 10 | 4 | 8 |
| Chaff, oaten, wheaten, lucerne, and other varieties | 20 | 6 | 15 |
| Ensilage, any form .. .. .. | 15 | .. | 6 |
| Cattle fodder (pumpkins and green fodder ) | 15 | 8 | 10 |
| Sorghum and millet .. .. .. | 10 | 5 | 6 |
| Hemp, 5 lb. .. .. .. .. | 5 | .. | .. |
| Flax, 5 lb. .. .. .. .. .. | 5 | .. | 2 |
| Cowpea seed, 7 lb. .. .. .. .. | 7 | 5 | 2 |
| Broom millet, 10 lb. .. .. .. | 10 | 8 | 5 |
| | 117 | 44 | 71 |
| 8. Wool— | | | |
| Greasy, 5 fleeces .. .. .. .. | 20 | 10 | 10 |
| Mohair .. .. .. .. .. | 5 | .. | 2 |
| | 25 | 10 | 12 |
| 9. Drinks, &c.— | | | |
| Temperance drinks, 6 bottles .. .. | 10 | 5 | 4 |
| | 10 | 5 | 4 |
| 10. Women's and Children's Work— | | | |
| Needlework, knitting, fine arts .. .. | 10 | 3 | 8 |
| School work, maps, writing, &c. .. .. | 10 | .. | 8 |
| Fancy work .. .. .. .. | 10 | 6 | 8 |
| | 30 | 9 | 24 |
| 11. Miscellaneous Articles of Commercial Value .. | 5 | 2 | 4 |
| 12. Plants and Flowers, in pots .. .. .. | 5 | 1 | 3 |
| 13. Time and Labour Saving Useful Articles, made on the farm | 10 | .. | 7 |
| 14. Effective Arrangement of Exhibits .. .. | 10 | 6 | 8 |
| | 600 | 290 | 347 |

## CORN-GROWING COMPETITION.

This interesting and, from a rural educational point of view, most highly valuable competition, which was arranged by the Department of Agriculture and Stock last year, was concluded on 30th June, 1915, and adjudicated upon in July last. For several reasons, principally climatic, the competitiors were grouped according to nine districts, embracing the whole State from the border of New South Wales northwards to Cooktown, and westwards as far as Longreach, Cunnamulla, and Wallangarra, thus including every town and rural district throughout the State, the divisions being nine in number—viz., Logan, West Moreton, Darling Downs North, Darling Downs South, Maranoa, Moreton, Wide Bay and Burnett, Central Queensland, and North Queensland. Prizes of the following value were awarded:—First £5, second £2, third £1, and in addition three special prizes to the value of £10, £5, and £3 to be awarded to the competitors who stood first, second, and third in the whole competition. The conditions will be found on page 61 of the August issue of this Journal, 1915, and also on page 124 of this issue. It is notified

by the Department that a similar Corn-growing Competition to that of 1914-15 will be held for 1915-16, entries closing with the Under Secretary, Department of Agriculture and Stock, Brisbane, on the 30th September next.

DISTRICT PRIZE WINNERS.

| | Points | £ | Yield. Bushels per Acre. |
|---|---|---|---|
| West Moreton— | | | |
| J. R. C. Hart, Blackbutt | 86.4 | 5 | 92 |
| F. A. Bade, Rosewood | 65.8 | 2 | 69 |
| A. M. Bachmann, Marburg | 60.7 | 1 | 56 |
| Darling Downs North— | | | |
| N. S. Smoothy, Pinelands, Crow's Nest | 77.1 | 5 | 83 |
| H. W. Abel, Geham | 74.9 | 2 | 82 |
| F. Franke, Cawdor | 72.2 | 1 | 76 |
| Darling Downs South— | | | |
| Albert Gouchee, North Killarney | 72.5 | 5 | 74.7 |
| Archibald Gouchee, North Killarney | 49.5 | 2 | 44.5 |
| A. E. Ernst, Spring Creek, Clifton | 44.1 | 1 | 42.8 |
| Maranoa— | | | |
| F. R. Rowland Bell | 29.7 | 5 | 22 |
| (One competitor, only one prize.) | | | |
| Moreton— | | | |
| R. Rudd, Upper North Pine | 56.4 | 5 | 52 |
| F. Woodford, Samford | 49.9 | 2 | 47 |
| S. R. Hulse, Yandina | 48.3 | 1 | 47.6 |
| Logan— | | | |
| F. M. Birt, Nerang | 46.8 | 5 | 41.2 |
| E. L. Marshall, Gramzow | 46.8 | 2 | 44 |
| R. A. Tulloch, Veresdale | 41.3 | 1 | 39 |
| Burnett and Wide Bay— | | | |
| A. Fittell, Eel Creek, Gympie | 63.9 | 5 | 67 |
| F. H. J. Hayden, Kingaroy | 59.5 | 2 | 55 |
| E. Hayden, Kingaroy | 51.1 | 1 | 48 |
| Central Queensland— | | | |
| R. J. Philp, Mount Larcom | 58.1 | 5 | 72.9 |
| Isabella Wilson, Yeppoon | 57.9 | 2 | 62.3 |
| F. Williams, Barmoya | 44.4 | 1 | 41.9 |
| North Queensland— | | | |
| Mary R. Dougherty, Malanda | 72.4 | 5 | 82 |
| J. D. Gellweiler, Kulara, Cairns | 58.7 | 2 | 61 |
| R. Vance, Barrine | 47.2 | 1 | 44.3 |

SPECIAL PRIZE WINNERS.

J. R. C. Hart, Blackbutt (West Moreton), £10.
N. S. Smoothy, Pinelands, Crow's Nest (Darling Downs North), £5.
H. W. Abel, Geham, Crow's Nest (Darling Downs North), £3.

PLATE 15.—STUD-SEED MAIZE AND CORN-GROWING COMPETITION EXHIBIT, DEPARTMENTAL COURT (AGRICULTURE AND STOCK), NATIONAL ASSOCIATION SHOW, BRISBANE, 1915.

## EXHIBITION NOTES, 1915.

### MILK TESTS.

National Champion Butter-fat test. £25 special prize, and a cash prize of £2 2s. yearly to the winner (presented by the Brisbane Newspaper Co., Ltd.). To be won three times by the same exhibitor, but not necessarily to be in succession or by the same exhibit. Cow, 4 years and over, averaging the greatest daily yield of butter-fat for 48 hours:—

| — | — | Milk, Lb. | Test. | Commercial Butter. | Average, 24 Hours. | Lact. Points. | Total, 24 Hours. |
|---|---|---|---|---|---|---|---|
| C. Bloss's Canary, Jersey .. .. | M. | 20·1 | 3·2 | ·70 | .. | .. | |
| | E. | 18·9 | 4·6 | ·95 | .. | .. | |
| | M. | 17·12 | 4·3 | ·84 | .. | 0 | |
| | E. | 18·2 | 4·2 | ·84 | 26·64 | 12 | 38·64 |
| Messrs. McIntyre Bros.' Handsome, Milking Shorthorn | M. | 28·6 | 3·2 | ·98 | .. | 0 | |
| | E. | 29·0 | 3·6 | 1·14 | .. | .. | |
| | M. | 31·11 | 3·7 | 1·28 | .. | .. | |
| | E. | 28·1 | 4·0 | 1·23 | 37·04 | .. | 37·04 |
| D. Dunn's Blossom III., Illawarra .. | M. | 27·8 | 3·0 | ·89 | .. | .. | |
| | E. | 26·9 | 3·4 | ·98 | .. | .. | |
| | M. | 27·6 | 3·4 | 1·01 | .. | .. | |
| | E. | 25·8 | 4·0 | 1·12 | 32 | 7 | 32·7 |
| J. and L. Paten's Jeanette of Wanora, Ayrshire | M. | 23·9 | 4·5 | 1·18 | .. | 0 | |
| | E. | 20·12 | 4·2 | ·96 | .. | .. | |
| | M. | 23·9 | 3·5 | ·89 | .. | .. | |
| | E. | 21·1 | 4·0 | ·93 | 31·68 | .. | 31·68 |
| D. Dunn's Jemima II. of Valley View, Illawarra | M. | 27·1 | 2·6 | ·75 | .. | 0 | |
| | E. | 25·14 | 4·1 | 1·17 | .. | .. | |
| | M. | 25·12 | 3·9 | 1·10 | .. | .. | |
| | E. | 22·22 | 3·7 | ·90 | 31·36 | .. | 31·36 |
| H. Marquardt's Roan, Milking Shorthorn | M. | 18·12 | 3·8 | ·78 | .. | .. | |
| | E. | 18·4 | 4·1 | ·82 | .. | .. | |
| | M. | 17·10 | 3·6 | ·69 | .. | .. | |
| | E. | 18·5 | 4·1 | ·83 | 24·96 | 5 | 29·96 |
| W. F. Hammell's Plum, Grade .. | M. | 19·12 | 3·7 | ·80 | .. | .. | |
| | E. | 17·15 | 4·4 | ·87 | .. | .. | |
| | M. | 17·13 | 3·5 | ·65 | .. | .. | |
| | E. | 17·12 | 4·1 | ·80 | 24·96 | 3·1 | 28·06 |
| V. Goodger's Pansy .. .. .. | M. | 24·6 | 4·1 | 1·10 | .. | .. | |
| | E. | 14·2 | 4·5 | ·70 | .. | .. | |
| | M. | 19·15 | 2·9 | ·62 | .. | .. | |
| | E. | 17·6 | 4·2 | ·81 | 25·84 | 0 | 25·84 |
| W. Middleton's Ruby of Devonport, Milking Shorthorn | M. | 17·8 | 3·2 | ·61 | .. | .. | |
| | E. | 16·14 | 4·7 | ·88 | .. | .. | |
| | M. | 18·0 | 4·5 | ·90 | .. | .. | |
| | E. | 16·11 | 4·4 | ·81 | 25·60 | 0 | 25·60 |
| V. Goodger's Roaney .. .. .. | M. | 18·6 | 3·5 | ·70 | .. | .. | |
| | E. | 17·2 | 4·8 | ·91 | .. | .. | |
| | M. | 16·12 | 3·0 | ·54 | .. | .. | |
| | E. | 17·13 | 4·4 | ·87 | 24·16 | 0 | 24·16 |
| E. Burton's King Lear's Buttercup, Jersey | M. | 17·6 | 3·6 | ·68 | .. | .. | |
| | E. | 16·0 | 4·1 | ·72 | .. | .. | |
| | M. | 15·4 | 3·6 | ·66 | .. | .. | |
| | E. | 12·6 | 4·6 | ·63 | 21·04 | ·5 | 21·54 |
| W. Middleton's Maggie, Milking Shorthorn | M. | 23·9 | 2·3 | ·57 | .. | .. | |
| | E. | 24·10 | 2·9 | ·76 | .. | .. | |
| | M. | 27·0 | 2·3 | ·65 | .. | .. | |
| | E. | 24·15 | 2·5 | ·66 | 21·12 | 0 | 21·12 |

## BUTTER AWARDS.

Following are the awards in the Butter Section:—

SALT BUTTER WITHOUT PRESERVATIVE, SUITABLE FOR EXPORT.

| —— | Flavour | Texture. | Col. | Salting. | Packing and Finish. | Totals. |
|---|---|---|---|---|---|---|
| Caboolture Co-operative Dairy Co., Ltd., Caboolture | 55 | 19½ | 7 | 4 | 4 | 89½ |
| Stanley River Co-operative Dairy Co., Ltd., Woodford | 54 | 19½ | 7 | 4 | 4 | 88½ |
| Killarney Dairy Co., Ltd., Killarney .. | | | Disqualified. | | | |
| Warwick Butter and Dairying Co., Ltd., Warwick | 57 | 18 | 6 | 4 | 4 | 89 |
| Warwick Butter and Dairying Co., Ltd., Allora | 57 | 18½ | 7 | 4 | 4 | 90½ |
| Warwick Butter and Dairying Co., Ltd., Texas | 58½ | 19 | 6½ | 4 | 4 | 92 |
| Marburg Butter Factory, Marburg .. | 54 | 18½ | 6 | 4 | 4 | 86½ |
| Mount Bismarck Co-operative Dairy Co., Mount Bismarck | | | Disqualified. | | | |
| Downs Co-operative Dairy Co., Ltd., Toowoomba | 59½ | 19½ | 7 | 4 | 4 | 94 |
| Logan and Albert Co-operative Dairy Co., Ltd., Beaudesert | 52 | 18½ | 7 | 4 | 4 | 85½ |
| Inverell Co-operative Butter Co., Ltd., Inverell, N.S.W. | 56 | 19 | 6½ | 4 | 4 | 89½ |
| Queensland Farmers' Co-operative Co., Ltd., Booval | 55 | 19 | 6½ | 4 | 4 | 88½ |
| Queensland Farmers' Co-operative Co., Ltd., Boonah | 58 | 20 | 7 | 4 | 4 | 93 |
| Queensland Farmers' Co-operative Co., Ltd., Grantham | 55 | 20 | 7 | 4 | 4 | 90 |
| Queensland Farmers' Co-operative Co., Ltd., Laidley | | | Disqualified. | | | |
| Atherton Tableland Co-operative Butter and Bacon Co., Ltd., Atherton | | | Disqualified. | | | |
| Oakey District Co-operative Dairy Co., Oakey | 53 | 19½ | 7 | 4 | 4 | 87½ |
| Goombungee Co-operative Dairy Co., Ltd., Goombungee | 59 | 19½ | 7 | 4 | 4 | 93½ |
| Kin Kin Co-operative Dairy Co., Ltd., Kin Kin | 54 | 19 | 7 | 4 | 4 | 88 |
| Silverwood Dairy Factory, Ltd., Terror's Creek | 55 | 19 | 7 | 4 | 4 | 89 |
| Silverwood Dairy Factory Co., Ltd., Gatton | 53 | 19 | 7 | 4 | 4 | 87 |
| Maryborough Co-operative Dairy Co., Ltd., Kingaroy | | | Disqualified. | | | |
| Maryborough Co-operative Dairy Co., Ltd., Biggenden | | | Disqualified. | | | |

Taking into consideration the closeness of the complete results in the case of the Downs Co-operative Dairy Co., Ltd., Toowoomba, which was only half a point behind the Goombungee Co-operative Dairy Co., Ltd., the judge recommended that an additional prize be awarded.

## AGGREGATE AWARD.

Special prize for the factory securing the highest aggregate number of points in all classes, and special prizes.

| — | Unsalted, Factory Made. | Fresh, Factory Made. | Export, 30 Days, Storage. | Without Preservative. | Export, 8 Weeks' Storage. | Aggregate. |
|---|---|---|---|---|---|---|
| Goombungee Co-operative Dairy Co., Ltd., Goombungee | 96 | 95 | 93 | 93½ | 93 | 470½ |
| Downs Co-operative Dairy Co., Ltd., Toowoomba | 95½ | 94½ | 94½ | 94 | 91½ | 470 |
| Queensland Farmers' Co-operative Co., Ltd., Grantham | 92½ | 93 | 95½ | 90 | 95 | 466 |
| Queensland Farmers' Co-operative Co., Ltd., Boonah | 91½ | 90½ | 91½ | 93 | 94½ | 461 |
| Inverell Co-operative Butter Co., Ltd., Inverell, N.S.W. | 92½ | 92 | 92 | 89½ | 91 | 457 |
| Warwick Butter and Dairying Co., Ltd., Texas | 91 | 90½ | 90 | 92 | 89½ | 453 |
| Warwick Butter and Dairying Co., Ltd., Allora | 91½ | 90½ | 88 | 90½ | 89½ | 450 |
| Silverwood Dairy Factory Co., Ltd., Terror's Creek | 91 | 89 | 90 | 89 | 90½ | 449½ |
| Marburg Butter Factory, Marburg .. | 93 | 90 | 90 | 86½ | 89½ | 449 |
| Silverwood Dairy Factory Co., Ltd., Gatton | 90½ | 91 | 91 | 87 | 89 | 448½ |
| Queensland Farmers' Co-operative Co., Ltd., Booval | 91 | 90½ | 90½ | 88½ | 88 | 448½ |
| Oakey District Co-operative Dairy Co., Oakey | 89½ | 88½ | 87½ | 87½ | 90 | 443 |
| Stanley River Co-operative Dairy Co., Ltd., Woodford | 90½ | 89½ | 89 | 88½ | 85 | 442½ |
| Kin Kin Co-operative Dairy Co., Kin Kin | 89½ | 89½ | 87 | 88 | 88 | 442 |
| Warwick Butter and Dairying Co., Ltd., Warwick | 91 | 87½ | 82 | 89 | 90½ | 440 |
| Logan and Albert Co-operative Dairy Co., Ltd., Beaudesert | 90½ | 88½ | 89 | 85½ | 86 | 439½ |
| Maryborough Co-operative Dairy Co., Ltd., Kingaroy | 90 | 92 | 92½ | .. | 92½ | 367 |
| Mount Bismarck Co-operative Dairy Co., Mount Bismarck | 90½ | 91½ | 90 | .. | 91 | 363 |
| Queensland Farmers' Co-operative Co., Ltd., Laidley | 91 | 91½ | 89 | .. | 88 | 359½ |
| Caboolture Co-operative Dairy Co., Ltd., Caboolture | 91 | 89 | 87½ | 89½ | .. | 357 |
| Maryborough Co-operative Dairy Co., Ltd., Biggenden | 89½ | 86½ | 87 | .. | 85½ | 348½ |
| Killarney Dairy Co., Ltd., Killarney .. | 85½ | 85½ | 90 | .. | 87 | 348 |
| Maleny Co-operative, Maleny .. .. | 88½ | 86 | 88½ | .. | 84¼ | 347½ |

Subsequent to the awards being made known, the judge, Mr. G. S. Stening, stated to a representative of the "Brisbane Courier" that the sections judged by him (butter, cheese, bacon, hams, and lard) showed a great improvement on former exhibits of their kind, not so much from points of excellence, but rather from the aspect of general consistency of quality. The points for the winning butters, he said, might not be as high as those in former years, but there was a greater number of butters coming into first grade than hitherto. This in itself was a striking evidence of the educational bearing that exhibits of this nature had upon manufacturers showing in the several sections. The drought the dairying districts had passed through in this State was no doubt a factor in the want of excellence on account of the part played by the breed of cattle and the quality of the pastures at the time the

butter or cheese was manufactured for show purposes. In butter, outside the flavour, the manufacture showed a striking improvement, and with the exception of a few exhibits, compared more than favourably with that of New South Wales. However, there was one detail in manufacture requiring further attention, and that was the working of the butter, for unless the working was sufficiently carried on not only texture faults, but faults in colour, were sure to arise. With this defect overcome the manufacture of the butters would be all that could be desired.

## CHEESE AWARDS.

The competition for the prizes in the cheese section was considerable, and of the successful competitors the Southwood Co-operative Dairy Company carried off three first prizes in the six classes. The Rosalie Cheese Factory at Leyburn annexed two firsts and the Leyburn Dairy Company, Limited, came first for matured cheeses. The awards were:—

| — | Flavour. | Texture. | Colour. | Finish. | Total. |
|---|---|---|---|---|---|
| **Two Exports, 70-80 lb., White, Suitable for English market.** | | | | | |
| Possible points .. .. .. .. .. | 50 | 25 | 15 | 10 | 100 |
| J. Wilson, Worongary, S. C. line .. .. .. | 40 | 24 | 15 | 9½ | 88½ |
| Warwick Butter and Dairying Co., Elbow Valley | 42½ | 24 | 15 | 9 | 90½ |
| Westmore Cheese Factory, Westmore, *via* Killarney | 42 | 24½ | 15 | 9½ | 91 |
| Rosalie Cheese Factory, Glencoe .. .. .. | 42 | 24 | 15 | 9 | 90 |
| Southbrook Co-operative Dairying Co., Southbrook | 45 | 25 | 15 | 9½ | 94½ |
| Downs Co-operative Dairy Co. Cheese Factory, Hodgson's Vale | 45 | 24½ | 15 | 9½ | 94 |
| Mount Tyson Farmers' Co-operative Dairy Co., Ltd., Mount Tyson | 44 | 24½ | 15 | 9 | 92 |
| **Two Exports, 70-80 lb., Coloured, Suitable for English market.** | | | | | |
| J. Wilson, Worongary, .. .. .. .. | 40 | 24 | 15 | 9½ | 88½ |
| Warwick Butter and Dairying Co., Elbow Valley | 42 | 24½ | 14½ | 9 | 90 |
| Westmore Cheese Factory, Westmore, *via* Killarney | 40½ | 24½ | 15 | 9 | 89 |
| Rosalie Cheese Factory, Glencoe .. .. .. | 43 | 24½ | 15 | 9½ | 92 |
| Southbrook Co-operative Dairy Co., Southbrook | 45 | 25 | 15 | 9 | 94 |
| Downs Co-operative Dairy Co., Hodgson's Vale | 44½ | 24½ | 15 | 9 | 93 |
| Kooroongarra Co-operative Dairy Co. .. .. | 43½ | 25 | 15 | 9 | 92½ |
| Mount Tyson Farmers' Co-operative Dairy Co., Ltd. | 43 | 24½ | 15 | 9 | 91½ |
| **Two Medium not exceeding 40 lb. matured.** | | | | | |
| Warwick Butter and Dairying Co., Elbow Valley | 40 | 25 | 15 | 9 | 89 |
| Rosalie Cheese Factory, Glencoe .. .. .. | 42 | 25 | 15 | 9½ | 91½ |
| Southbrook Co-operative Dairy Co., Southbrook | 38½ | 24½ | 15 | 9 | 87 |
| Westmore Cheese Factory, Westmore, *via* Killarney | 39 | 24½ | 15 | 8½ | 87 |
| Rosalie Cheese Factory, Glencoe .. .. .. | 44 | 24½ | 15 | 9½ | 93 |
| Southbrook Co-operative Dairy Co., Southbrook | 40 | 24 | 15 | 8½ | 87½ |
| Downs Co-operative Dairy Co.'s Cheese Factory, Hodgson's Vale | 42½ | 24½ | 15 | 9½ | 91½ |
| Biddeston Co-operative Dairy Co., Ltd., Biddeston, *via* Oakey | 41½ | 24½ | 15 | 9 | 90 |
| D. Keir, Bellthorpe, *via* Woodford .. .. | 40½ | 24 | 15 | 8½ | 88 |
| Greenmount Dairy Co., Ltd., No. 3 Factory, Greenmount | 40½ | 24 | 15 | 9 | 88½ |
| Greenmount Dairy Co., Ltd., No. 3 Factory, Greenmount | 41½ | 24½ | 15 | 9 | 90 |
| Greenmount Dairy Co., Ltd., No. 2 Factory, Greenmount | 40½ | 24 | 15 | 9 | 88½ |
| Greenmount Dairy Co., Ltd., No. 6 Factory, Greenmount | 41½ | 24 | 15 | 9 | 89½ |
| Greenmount Dairy Co., Ltd., No. 6 Factory, Greenmount | 43 | 24½ | 15 | 9½ | 92 |

| — | Flavour. | Texture. | Colour. | Finish. | Total. |
|---|---|---|---|---|---|
| **Two Loaf Cheeses, not exceeding 12 lb., under two months old.** | | | | | |
| Greenmount Dairy Co., Ltd., No. 3 Factory, Greenmount | 43 | 24½ | 15 | 9 | 91½ |
| J. Wilson, Worongary, S.C. line .. .. .. | 41½ | 24½ | 15 | 9½ | 90½ |
| Warwick Butter and Dairying Co., Elbow Valley | 41½ | 24½ | 15 | 9 | 90 |
| Westmore Cheese Factory, Westmore .. .. | 39 | 24 | 15 | 9 | 87 |
| Westmore Cheese Factory, Westmore .. .. | 39½ | 24 | 15 | 9 | 87½ |
| Rosalie Cheese Factory, Glencoe .. .. .. | 42 | 24½ | 15 | 9½ | 91 |
| Southbrook Co-operative Dairy Co., Southbrook | 43½ | 24½ | 15 | 9 | 92 |
| Kooroongarra Co-operative Dairy Co., Kooroongarra | 41 | 24½ | 15 | 9 | 89½ |
| Downs Co-operative Dairy Co., Ltd., Toowoomba | 42 | 24½ | 15 | 9½ | 91 |
| Biddeston Co-operative Dairy Co., Ltd., Biddeston | 41 | 24 | 15 | 9 | 89 |
| Leyburn Dairy Co., Ltd., Roma street, Brisbane | 41½ | 25 | 15 | 9 | 90½ |
| Pittsworth Dairy Co., Ltd., Pittsworth .. .. | 42 | 24½ | 15 | 9 | 90½ |
| Moola Cheese Factory, Braeside, *via* Dalby .. | 41 | 24½ | 15 | 9 | 89½ |
| Downs Co-operative Dairy Co., Ltd., Toowoomba | 41½ | 24 | 15 | 9 | 89½ |
| Biddeston Co-operative Dairy Co., Ltd., Biddeston, *via* Oakey | 41 | 24½ | 15 | 9 | 89½ |
| Leyburn Dairy Co., Ltd., Roma street, Brisbane | 44 | 24½ | 15 | 9½ | 93 |
| Mount Tyson Farmers' Co-operative Dairy Co., Ltd. | 44 | 24½ | 15 | 8½ | 92 |
| Greenmount Dairy Co., Ltd., No. 3 Factory, Greenmount | 41 | 25 | 15 | 9 | 90 |
| Greenmount Dairy Co., Ltd., No. 2 Factory, Greenmount | 41 | 25 | 15 | 9 | 90 |
| **Two Medium, not exceeding 40 lb., under two months old.** | | | | | |
| J. Wilson, Worongary, S.C. line .. .. .. | 40 | 24½ | 15 | 9½ | 89 |
| Warwick Butter and Dairying Co., Ltd., Elbow Valley | 42 | 24 | 15 | 8½ | 89½ |
| Westmore Cheese Factory, Westmore, *via* Killarney | 41 | 24 | 15 | 9 | 89 |
| Rosalie Cheese Factory, Glencoe .. .. .. | 44 | 25 | 15 | 9½ | 93½ |
| Southbrook Co-operative Dairy Co., Southbrook | 42 | 25 | 15 | 9 | 91 |
| Kooroongarra Co-operative Dairy Co. .. .. | 43½ | 25 | 15 | 9 | 92½ |
| Downs Co-operative Dairy Co., Ltd., Toowoomba | 43 | 24½ | 15 | 9 | 91½ |
| Leyburn Dairy Co., Ltd., Roma street, Brisbane | 42 | 24½ | 15 | 9 | 90½ |
| Pittsworth Dairy Co., Ltd., Pittsworth .. .. | 42 | 25 | 15 | 9 | 91 |
| Moola Cheese Factory, Braeside, *via* Dalby .. | 41 | 24½ | 15 | 9 | 89½ |
| Moola Cheese Factory, Braeside, *via* Dalby .. | 42 | 24½ | 15 | 9 | 90½ |
| Burnside Cheese Factory, Tannymorel .. .. | 42 | 25 | 15 | 8½ | 90½ |
| Cambooya Dairying Co., Ltd., Cambooya (No. 1) | 40 | 24 | 15 | 9 | 88 |
| Cambooya Dairying Co., Ltd., Cambooya (No. 2) | 39 | 24 | 15 | 9 | 87 |
| Greenmount Dairy Co., Ltd., No. 3 Factory, Greenmount | 42 | 24½ | 15 | 9½ | 91 |
| **Two Loaf Cheeses not exceeding 12 lb. matured.** | | | | | |
| Warwick Butter and Dairying Co., Elbow Valley | 38 | 24 | 15 | 8½ | 85½ |
| Moola Cheese Factory, Braeside .. .. .. | 40½ | 24½ | 15 | 9 | 89 |
| Burnside Cheese Factory, Tannymorel .. .. | 42 | 24½ | 15 | 9 | 90½ |
| D. Keir, Bellthorpe, *via* Woodford .. .. | 40½ | 24½ | 15 | 9 | 89 |
| Wm. Smith, Yangan .. .. .. .. | 41 | 24½ | 15 | 8½ | 89 |
| Cambooya Dairy Co., Ltd., Cambooya (No. 1) | 40½ | 24 | 15 | 9 | 88½ |
| Cambooya Dairy Co., Ltd., Cambooya (No. 2) | 42 | 24 | 15 | 9 | 90 |

## COTTAGE GARDEN COMPETITION.

It is many years since the National Association first offered a prize for the best cottage garden in and in the suburbs of Brisbane, and it is highly satisfactory to find that the Council of the Queensland National Association have this year offered substantial prizes for the laudable purpose of encouraging a taste for flower and vegetable gardening in Brisbane and its suburbs, and the satisfactory response to the Association's invitation to compete in this section affords good evidence that the movement has been greatly appreciated. In the year 1881 we ourselves obtained the Society's medal and certificate in the only competition of this description which had been held up to that date. There were, if our memory serves us, seventeen entries, and the conditions were much the same as those laid down for competitors in the Cottage Garden Section in August, 1915.

The revival of the garden competitions cannot but have a beneficial effect in the direction of beautifying the surroundings of suburban dwellings, and incidentally will possibly lead to the establishment of a very lucrative business in the cut-flower trade. This year, 36 gardens competed, and were judged by Messrs. J. Soutter and Mr. J. F. Bailey, Colonial Botanist, who remarked on the area, soils, plants, &c., that there was a great sameness in the laying out of the gardens, and that in some districts, notably Paddington, there was a want of the first essential for successful gardening—*i.e.*, water, and much patience and industry had been shown by competitors in that district to overcome the difficulty.

The following are given as the results obtained by the first twelve of the competitors:—

The numbers represent—1, general effect in laying out gardens, &c.; 2, variety and condition of plants; 3, quality of flowers and foliage plants; 4, quality and quantity of vegetables; 5, condition of garden generally:—

| — | 1 | 2 | 3 | 4 | 5 | Total. |
|---|---|---|---|---|---|---|
| W. F. Greenslade, Clayfield | 12 | 6 | 9 | 12½ | 9 | 48½ |
| J. Smith, Church street, Red Hill | 12½ | 7 | 9 | 11 | 8 | 47½ |
| W. Brewster, Byrne Estate | 12 | 7 | 12 | 8 | 8 | 47 |
| Mrs. Grenning, Zillmere | 10 | 7 | 10 | 11 | 8 | 46 |
| J. H. Buxton, Bowen Hills | 12 | 7 | 9 | 10 | 7 | 45 |
| H. Hacker, off Bowen Bridge road | 12 | 7 | 9 | 9 | 6 | 45 |
| C. Short, Toowong | 10 | 7 | 13 | 10 | 6 | 45 |
| Jas. Hamilton, Kennedy terrace | 10 | 7 | 9 | 12 | 6 | 44 |
| R. Fulcher, Kennedy terrace | 11 | 8 | 11 | 7 | 7 | 41 |
| R. Littleford, View street, Paddington | 9 | 7 | 9 | 12 | 7 | 44 |
| W. Bell-Booth, Duke street, Thompson Estate | 10 | 7 | 8 | 10 | 7 | 42 |
| R. J. Street, Duke street, Thompson Estate | 10 | 7 | 9 | 9 | 7 | 42 |

The judges in their report state that the first and second prizes were won by elderly gentlemen, who seemingly devote the whole of their time to tending their gardens, and, therefore, may be considered to have an advantage over those who, having occupations which take them daily from home, can only spare odd times for the work, but this is not a point to be taken into consideration by the judges. Several of the competitors were handicapped by having paid little or no attention to the vegetable portion of their gardens. In one of these gardens—namely, that of Mr. P. Dowd, of Bell street, Kangaroo Point, was an illustration of what good effect may be obtained from grass and shrubs, with a touch of the old-fashioned carpet-bedding. The whole area is laid down in grass with roses and other shrubs dotted here and there, and is kept in beautiful order. Another, at Clayfield, was tended solely by Mr. Scott, a young man employed by the Tramways Company. This garden is most tastefully laid out, and the massing of plants of one kind will be sure to prove effective later on in the spring. Mr. Thomas's garden at Indooroopilly could only be judged so far as flowers and vegetables were concerned, as the large area at the disposal of the owner placed it at an advantage far beyond that of one eligible for competition as a "cottage garden." Here are to be seen some fine palms and other trees bordering the drive, and placed on the lawns. A feature of this garden is a hedge composed of pink and red Bougainvilleas, the gorgeousness of which is almost beyond description. The pink variety is also used with beautiful effect trained along the veranda. It would be worth while for anyone interested to take a trip along Hart's road to see the effect produced by using these plants in this manner. Mr. Greenslade's garden is an ideal "cottage garden," sufficient plants being grown to beautify the home on the one hand, and to supply the household requirements on the other hand. Mr. Smith's effort has been made under most unfavourable conditions so far as position is concerned, as it stands on the side of a steep hill, with a low depth of soil to work upon. The leading feature of Mr. Brewster's garden is the excellent display of sweet peas and Shasta daisies. In each garden every inch of space has been used to advantage.

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We are indebted to the courtesy of the Secretary of the National Association for the following correct list of prize-takers in the District and One-Farm Exhibits for the past thirteen years.

DISTRICT EXHIBITS.

*First Award.*

| | |
|---|---|
| 1903—5 Competitors ... ... ... ... | Moreton Districts, Nundah, and Zillmere. |
| 1904—7 Competitors ... ... ... ... | Moreton—Combined Moreton Association. |
| 1905—8 Competitors ... ... ... ... | Moreton. |
| 1906—5 Competitors ... ... ... ... | Wide Bay and Burnett and Moreton—equal. |

| | |
|---|---|
| 1907—3 Competitors ... ... ... ... | Moreton. |
| 1908—3 Competitors ... ... ... ... | Central Queensland. |
| 1909—5 Competitors ... ... ... ... | Wide Bay and Burnett. |
| 1910—No entries. | |
| 1911—"A" Grade, 1 Competitor ... | Central Queensland. |
| "B" Grade, 3 Competitors ... | Lowood and Tarampa District. |
| 1912—"A" Grade, 3 Competitors ... | Central Queensland. |
| "B" Grade, 2 Competitors ... | Kingaroy. |
| 1913—"A" Grade, no entries. | |
| "B" Grade, 5 Competitors ... | Fassifern. |
| 1914—"A" Grade, 2 Competitors ... | North Coast Agricultural Societies' Union, Lismore, N.S.W. |
| "B" Grade, 8 Competitors ... | Fassifern. |
| 1915—"A" Grade, 3 Competitors ... | South Coast District Display Association. |
| "B" Grade, 5 Competitors ... | Gympie. |

ONE-FARM EXHIBITS.

*First Award.*

| | |
|---|---|
| 1910—6 Competitors (and 1 non-competitive) | Prevost Brothers, Moss Vale, N.S.W. |
| 1911—1 Competitor ... ... ... ... | Allen, D. H. A. and W., Chatsworth, Gympie. |
| 1912—2 Competitors (and 1 non-competitive exhibit) ... ... ... ... | Muller, T. P., Tirroan, Gin Gin. |
| 1913—2 Competitors ... ... ... ... | Franke, H., Cawdor. |
| 1914—5 Competitors ... ... ... ... | Todd, A. P., Rockhampton. |
| 1915—3 Competitors (one retired) ... ... | Williams, O. C. |

## HOUSEHOLD HINTS.

### THE VALUE OF VINEGAR.

All housewives would seldom be without vinegar on the kitchen shelf if its value were more widely known.

Its usefulness in the household can hardly be over-estimated, as there are a surprisingly large number of duties that can be rendered comparatively easy by its application.

The boiling of eggs when the shells are cracked sometimes proves a little difficult. When this happens, add a small quantity of vinegar to the water, and the egg will be cooked as satisfactorily as if the shell had been undamaged.

Where it is desired to keep meat, and the more costly methods are impossible, the use of vinegar will again overcome the difficulty. Simply wrap the meat in a cloth wet with vinegar and it will be kept nice and fresh. Wash off the vinegar before cooking operations.

Vinegar heated to boiling-point will also be found a most effective softener of hard brushes which have become dry and otherwise too hard to use.

Then, a little vinegar rubbed over the hands when they have become red and discoloured through rough work or too frequent dabbling in soapy water will greatly improve and whiten them.

# Pastoral.

## SETTLERS' FLOCKS ON COASTAL LANDS.

Mr. J. R. Chisholm writes us as follows from The Plains, Prairie, N.Q.:—

Since writing my paper on settlers' flocks, I have been through from Gladstone to Tamworth, in New South Wales, by rail, and I think now, by what I saw of some lands, and what I heard from those I travelled with and met, that I may have treated the matter of worms in coast-kept sheep too lightly. Will you therefore please give me space for a few lines more on this subject.

Although in my paper I referred to coast flocks in the North being successfully kept, and with little attention, yet these I know are on sweet country, and I saw much land—between Bundaberg and Maryborough, for instance—that, I should say, was not sweet, and I would say there may be areas about Gatton, Helidon, and thereabouts also wormy country; and I spoke with a New England man in the train, and he tells me of much of his district where the sheep have to be drenched continually to keep them healthy. Throughout New Zealand they grow good sheep and superfine wools, and those seen from the train look healthy enough; hence stockowners there must deal with worm troubles successfully.

My object in writing is to encourage the small settler to keep sheep, and just now is his opportunity, for breeding sheep from the Longreach district could be bought cheaply, and they would be merinos; but a settler buying a little lot, of 25 to 50, could get a Lincoln, Corriedale, or Border Leicester ram, or a good Shropshire or Romney, when he would soon have big lambs, and could pot the ewes for his pigs. However, I was going to refer to worms in sheep, and wished to emphasise the ease with which a small flock is handled. Some years ago we got some Lincoln rams from South Australia and, unknown to me, they were transhipped in Sydney, and kept in a wormy paddock out by Rooty Hill for a few days. When they came here I let them go with sheep in a paddock, and some time afterwards I saw they were doing no good; so I got Mr. Collins, the stock inspector then at Hughenden, to come down. He had been about the Burnett country as a lad, when it was all sheep-stocked, and he said at once that the rams were wormy. I said they had come off a sound country in South Australia and this could not be. However, we killed one, and found both tape and stomach worms (the little red fellows). We at once drenched the rams with an arsenic drench, but it was a good while before they did any good; and, by the way, the Lincolns were never very much of a success here. However, some time afterwards, we found worms in the sheep where these rams had been, and we drenched 1,500 of them in half a day—quite effectively, too, because we never

had any more worm trouble; but, as I said in my paper, ours is a dry country. Think, then, how quickly a home flock could be handled.

At that time, however, we read up a good deal of literature on worms in sheep, and to me, anyone who could talk worms in sheep was congenial company. Much of my reading goes to show that most sheep worms find their resting places by the medium of dirty water. Little waterholes and small excavations would be the home of worm eggs in dry weather. The man who waters his sheep out of troughs supplied from a well will have less trouble than his neighbour with a small dam or tank excavation.

In many of the American States sheepowners have worm troubles. They give common salt in plenty, and sulphate of iron, about 2 oz. of the latter to 1 lb. of salt. The sulphate of iron must be added to the salt a little at a time, otherwise you may put the sheep off it. A popular worm remedy in American sheep husbandry is gasoline. They add this to the lick, only a drop or two at first, to get the sheep used to the smell of it, then add little by little. Turpentine and coal tar mixed would be about equal to the gasoline. I believe in turpentine as a worm remedy for all stock, and for sheep it is popular and effective in many countries. The dose is one cup of turpentine to two cups of milk, giving the grown sheep half of a small-sized sauce bottle to each dose, after starving them for twenty-four hours. Keep them in for a few hours, and then let them out for a feed, and shut them in again, watching the droppings for results. In all dosing and medicinal matters, one must be guided by results and see what good is done by the dosing, so that the treatment may be known to be effective or, if otherwise, that some other may be substituted. Home flocks of sheep should be quiet, ready feeders and, where this is so, they can easily be given any medicine mixed with food, provided judgment is exercised in mixing a very little at a time so that they may not be put off it.

The treatment I have suggested may deal with stomach worms and tapeworms successfully. Where the more malignant varieties of worms affecting the head, liver, and lungs of sheep are found, it is matter for consideration if the land cannot be put to better profit than may accrue from sheep.

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## WHEAT AND GRASS CULTIVATION.

By P. R. GORDON.

If the present disastrous European war has the effect of greatly extending the cultivation of wheat in Queensland, it will also, incidentally, greatly benefit the meat export trade and the pastoral industry generally. Many thoughtful men among the pastoralists hold the opinion that the time is not far distant when the cultivation of exotic grasses on much of the available waste lands on the coast watershed, and for many miles inland, west of the coast range, will be resorted to by many of our more enterprising graziers, and the extension of wheat growing will provide the very best conditions for inaugurating such a system.

It will, of course, be known to many of our wheatgrowers that the first great impetus to wheatgrowing in New South Wales was by the inauguration of what is known as the share-system of cultivation. This system was initiated about twenty-five or thirty years ago by the late Hon. George H. Greene, of Iandra Station, Grenfel district, New South Wales. He contracted with farmers and others without capital, men possessing a practical knowledge in the growth of crops, to plough the land, plant the seed, and harvest the crops; he, on his part, giving the use of the land free of rent, providing the seed wheat, and in some if not in all cases advancing the money to provide the necessary farming implements. It is also known to the writer that he was willing to lend the free use of young horses to those of the cultivators who cared to break them into harness. When harvested, the crop was shared in equal parts between the owner of the land and the cultivators. The system soon became general and rendered New South Wales the only State of the Commonwealth in a position to export a large surplus of wheat. Two crops of wheat in succession were thus taken off the same land, when the cultivators were moved on to another portion of virgin soil. The land from which the wheat crop had been taken was either allowed to return to indigenous grasses or planted with exotic grasses. If the former, it is well known to men of experience that the native pasture is greatly improved by the breaking up of the surface soil, and cattle and sheep always prefer it to pasture on undisturbed soil. It is not the object of the present writing to trace the effect that the share-system has had on the production of wheat in New South Wales, but to show the splendid opportunity the system offers for laying down in cultivated grasses large areas of land, thus greatly increasing its grazing capabilities, both for dairying purposes and for the fattening of stock, thus coming into line with other countries, such as New Zealand and Argentine, in fattening off cattle at early ages, and thus bringing the quality of our beef more in accordance with the requirements of our butchers and tastes of foreign meat consumers. In normal times there are always available plentiful supplies of store cattle from the larger inland grazing holdings, and farms of improved pasture could be very profitably used in the fattening of store stock. There are many excellent exotic fodder grasses that have taken kindly to the Queensland climate, among others, lucerne, Rhodes grass, Paspalum dilatatum, sheep Burnett, fescue, &c.; and the late Mr. F. M. Bailey, the veteran Government Botanist, pointed out many of our indigenous grasses which not only were of great value as fodder plants but which were greatly improved in their habits of growth and in quality by cultivation. The practice in Great Britain and other countries in the Northern Hemisphere, when laying down fields in pasture, is to sow the grass seeds with the wheat or oat crops, as the case may be; the cereal crop affording the necessary protection from the sun during their earlier growth. This could easily be carried out when sowing the second crop of wheat. This has the double advantage, in countries where straw forms an important item in cattle food, in rendering it more digestible and palatable for the stock. The experience of Queensland farmers who have experimented with Rhodes and other

grasses of rank growth will suggest to them whether they would be apt to overshadow the wheat crop before the latter arrives at maturity. That the cultivation of pastures would immensely increase our annual "cast" of fat cattle and sheep, in addition to improving the quality of the meat, will be regarded as a matter of course, and that it would largely increase the flow of milk in dairy herds is equally self-evident.

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## FEEDING AND MANAGEMENT OF MILCH GOATS.

Feeding is an important question, and naturally one is desirous of obtaining the best results combined with economy. Whether goats are kept tethered or running at large, the best fodder for hand feeding is prime lucerne chaff, and bran together with linseed meal and sweet potatoes, as a valuable addition to the diet, and to give variety.

If kept tied up, the ration should consist of the following proportions, to be given twice a day, morning and night, preferably at milking time, viz.:—Prime lucerne chaff, 2¼ lb.; bran, 3 single handfuls; linseed meal, half handful; sweet potatoes, cut up, 1 lb.

Note.—If the potatoes are given lessen the bran to half. The items mentioned should be mixed well, excepting the cut-up potatoes, which should be placed on top. A little green lucerne is good, but let it wilt for a day or two before feeding, as it might produce hoven otherwise.

It should be borne in mind that it will take nanny at least a fortnight to learn to feed properly, and until she does the yield will not increase.

Bran when made wet acts as an aperient, but when given dry it is a valuable food, so do not wet the bran, as it sours quickly.

Grain of any kind is too heating, and has the effect of putting them back with the milk yield, and if persisted in will dry them off, corn in particular. If a grass plot is available it is an excellent plan to tether them so that they can get a pick. If the available grass is small in area, it is better to cut or pull it, and put it in their manger. They are very fond of milk thistles.

If able to allow the goats their freedom, it is astonishing the variety and amount of food they will collect. Such being the case, the quantities of feed to be given when kept in captivity can be reduced to half or less, depending on the value of what they can find. The milk yield will help to determine this point. A good goat will keep in milk profitably for twelve months, or even longer, but it is not desirable to keep them in more than a year. If this end is to be attained they must be kept away from the buck.

The diet can always be supplemented by bits of bread, potato peelings, and waste from the kitchen, but all such waste must be

clean, else nanny will not eat it, nothwithstanding the assertion that they will thrive on jam tins and old boots. Certainly, they are very hardy, but most particular about what they eat.

It is necessary to have a shelter of some kind for them, as they do not like rain or damp places. Always have fresh drinking water on hand, and see that it is not soiled.

In selecting milkers it is best to see them milked before purchasing if possible. It is well to keep the following in mind, viz.—"It takes no more to feed a good animal than a bad one."

The Angora goat is of no value as a milker; the common goat is by far the best. A nanny that will give two quarts a day when just in must be considered an excellent milker.

Goats' milk will stand one-third its own volume of added water, and will then be richer than ordinary cows' milk, and will be found quite the thing for all ordinary purposes.

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## THE STOMACH-WORM IN SHEEP.

By W. G. BROWN, Instructor in Sheep and Wool.

[CONTINUED FROM AUGUST NUMBER.]

Another set of experiments conducted by Dr. Theiler will have interest to most sheep farmers in Australia who are grazing sheep on infected country, the subject being—"What is the effect of dosing pregnant ewes?"

The sheep experimented upon were 4, 6, and 8 tooth sheep. The table showed some interesting results, but is too long for insertion here.

Thirty ewes in an advanced stage of pregnancy were dosed with various amounts of Cooper's dip and bluestone, and in only four cases were the lambs born dead. Three of these four cases showed twin lambs which died; the singleton died a few days after birth. Dr. Theiler's conclusions on the experiment are:—

"The dosing of pregnant ewes with the maximal safe dose of Cooper's dip and bluestone was followed, in two instances, by the death of the twins. This may be due to the actual dose, since in one other instance where the twins survived, the ewe had only been dosed with half the safe dose."

In regard to the use of arsenic in this matter, I met with a curious experience two years ago, at Emerald, in the Central district. A sheep farmer who had some 2,000 ewes about to lamb, informed me that he would like advice about them. Several days later I visited his farm, and, sure enough, found his sheep wormy, and also heavy in lamb. Knowing that ewes with lambs at foot may safely be drenched without injury to the lambs, I advised him to wait, and drench his ewes after

they lambed. He then said triumphantly, "I thought you would say that. I drenched them all two days ago." He used Pottier's dip and got good results. For several weeks I visited these sheep at regular intervals, and found in the end that the lambing was very successful. There is no doubt, however, that he took a big risk, and, in my opinion, an unnecessary one, for reasons stated above.

## THE DOSING OF EWES WITH LAMBS AT FOOT.

This question also has interest for us, and another set of tables shows that the dosing of ewes with the maximal safe dose of Cooper's dip and bluestone had no ill effect on the lambs suckled by the dosed sheep.

This is in accordance with facts I have noticed in drenching ewes with the arsenical drench. Absolutely no ill effect on the lambs was to be observed after drenching the ewes with the full dose (2½ grains).

## THE LICK.

"The second method of dosing sheep is by allowing them free access to a lick containing vermifuge ingredients. The danger of this method is, obviously, that sheep may get too much of the lick." Thus Dr. Theiler. My experience is that sheep, after the first day of two, only help themselves sparingly to the salt lick, whatever other ingredients are included.

Dr. Theiler's conclusions after the experiments are—"The free access of sheep to a lick containing Cooper's dip and bluestone for a period of three months, during which time one sheep consumed on an average daily 2·3 grains of Cooper's dip and 2·3 of bluestone, had no decisive effect on the worms. The sheep kept in good condition, but the controls which were not dosed showed exactly the same condition, so that no effect, whether good or bad, could be noticed in the sheep. This experiment should indicate that the method of allowing sheep to partake of vermifuge through the medium of a lick is by no means a method which can be considered to be preferable to the dosing of the sheep with the optimal doses."

Other drenches than Cooper's dip and bluestone were tried by Dr. Theiler, and from time to time I shall make extracts from his published conclusions on these. It is a matter of such importance to this country that all information should be searched for and spread broadcast. The pest is making headway fast in almost every district in Queensland, excepting the very far West. It is only reasonable to conclude that even there it is possible that once these parasites get a footing, as much loss and trouble will be caused by the parasite as in the closer settled areas nearer the coast. I know that they are in as dry areas as are to be found in Queensland, as at Alpha, Jericho, Augathella, Surat, Yeulba, &c., which are surely dry enough areas, yet worms are to be found a pest in these districts.

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF JULY, 1915.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Noble Dot ... | Jersey ... ... | 2 May, 1915 | 612 | 4·6 | 33·17 | |
| Lady Twylish | ,, ... ... | 5 June ,, | 562 | 4·7 | 31·14 | |
| Netherton Belle | Ayrshire ... ... | 23 April ,, | 630 | 4·2 | 31·10 | |
| Bluebelle ... | Jersey ... ... | 20 June ,, | 724 | 3·6 | 30·53 | |
| Iron Plate ... | ,, ... ... | 21 Feb. ,, | 466 | 5·4 | 29·75 | |
| Miss Bell ... | ,, ... ... | 2 July ,, | 514 | 4·2 | 25·38 | |
| Lark ... | Ayrshire ... ... | 17 June ,, | 618 | 3·4 | 24·55 | |
| Black Bess ... | Jersey ... ... | 4 June ,, | 471 | 4·2 | 23·23 | |
| Lady Athol | Shorthorn... ... | 29 May ,, | 545 | 3·6 | 22·99 | |
| Lady May ... | Ayrshire ... ... | 7 Mar. ,, | 513 | 3·6 | 21·64 | |
| Lady Lil ... | Jersey ... ... | 27 June ,, | 410 | 4·2 | 20·23 | |
| Cocoatina ... | ,, ... ... | 6 Mar. ,, | 332 | 4·9 | 19·18 | |
| Thornton's Fairetta | ,, ... ... | 27 Mar. ,, | 325 | 4·7 | 18·0 | |
| Lady Melba | Holstein ... ... | 6 Mar., 1914 | 413 | 3·7 | 17·90 | |
| Nellie II. ... | Shorthorn... ... | 20 July ,, | 428 | 3·5 | 17·52 | |
| Miss Melba | Holstein ... ... | 22 Nov. ,, | 459 | 3·2 | 17·12 | |

The following cows were stall fed, in preparation for Brisbane Exhibition :—Noble Dot, Netherton Belle, Iron Plate, and Black Bess. The remainder of the herd grazed on natural pastures, supplemented by a ration of ensilage.

## DRIED YEAST AS FOODSTUFF.

With the increased prices of imported concentrated foodstuffs, it is desirable that farmers should keep their eyes open for any new sources of suitable foods which may be available.

Such a food, according to an article appearing in the Journal of the Board of Agriculture, appears to be dried yeast.

In Germany it is estimated that the output of brewers' yeast is about 69,000 tons a year, a large proportion of which is subjected to the drying process and sold for stock feeding. The small quantity of dried yeast prepared in this country has been mainly exported to Germany, where the product has grown in favour so rapidly that the demand is said to have exceeded the supply. The high percentage of albuminoid in dried yeast is a feature to be noted. From various

analyses it appears to contain from 45 to 50 per cent. of this valuable constituent, and in this respect is only equalled amongst ordinary farm foods by decorticated seed meal or cake and soy bean meal and cake.

Feeding experiments with dried yeast have been carried out at Garforth, and the report on the results is of a distinctly favourable character.

It is, therefore, considered opportune by the Board of Agriculture that apart from the exceptional circumstances of the moment, the attention of the British farmer should be directed to this new feeding material, and especially that, if the claims as to its merits can be substantiated, every effort should be made to develop the home demand to such an extent as to render exportation in the future as unnecessary as it is undesirable.

According to the experience gained during the trials, the results were summarised as follows:—

1. Dried yeast has proved a safe food for cows, pigs, and calves.

2. For cows, dried yeast is not to be strongly recommended, since they show a special aversion to its bitter taste.

3. It has proved a good food for pigs, having given results markedly better than those obtained with an equal weight of wheat "sharps." Despite the increased cost of the ration on introducing dried yeast in the place of an equal weight of "sharps," the margin of profit on the feeding has been undoubtedly increased.

4. Dried yeast has proved a safe food for calves, but no evidence has been obtained as to its merits in comparison with other foodstuffs commonly used for calf-rearing.

5. Dried yeast keeps well, and on mixing with other meals and water may be kept for some time without objectionable fermentation taking place.

6. In arriving at these conclusions no account has been taken of the value imparted to the manurial excreta of the animals by the consumption of dried yeast. From its composition, this may be expected to be as high as that of any other foodstuff commonly used on the farm.

7. Although the experience with dried yeast at Garforth, as outlined above, has been favourable, there is no reason to believe, either from the results of experiments or from careful observation of the general health of the animals throughout the tests, that the dried yeast possesses special medicinal or dietic virtues which any other highly digestible food rich in albuminoids might not be expected to possess.

The Board of Agriculture would, no doubt, be ready and willing to supply information as to the best way of utilising the substance for stock-feeding purposes.—"Mark Lane Express."

# The Orchard.

## PINEAPPLE MEMOS.

C. F. BARKER, Barmundoo—

Following are replies to your questions:—

*Q.* 1. What is the average yield of pineapples per acre on fair to good pine land?

*Q.* 2. What is the average (about) gross profit per acre of pines under safe conditions?

*A.* 1 and 2. Returns fluctuate. £35 and £80 per acre. 10,000 to 12,000 pines not uncommon, say 10 to 15 tons per acre.

*Q.* 3. What labour is required? About how many acres can a man keep cleared, manured, and generally attended to?

*Q.* 4. Does this labour require to be kept at work regularly? In other words, does the planter employ the majority of his hands permanently or only at particular periods, say, when the cultivation requires cleaning or the fruit picking?

*A.* 3 and 4. Five to 10 acres or more. It depends on the man, nature of the soil, horse or hand labour. Labour may or may not be continuous if it is required to keep the plantation clean and for harvesting the crop.

*Q.* 5. What is the usual class of labour employed, and at what wages?

*A.* 5. Ordinary farm or garden hands at the ruling rate of wages for the district.

*Q.* 6. Is it your opinion that much experience is required to be successful at pinegrowing? What chance has a man without previous experience at fruit-growing of making a success at pine cultivation?

*A.* 6. No. A good cultivation has a splendid chance.

Q. 7. Is it customary or beneficial to grow other fruits with pines?

*A.* 7. Ground crops, such as peas, beans, tomatoes, &c., may be grown between the rows for the first year or two, but fertilisers must be used to prevent the pines being robbed of any sustenance.

*Q.* 8. Does disease frequently destroy a whole crop of pines?

*A.* 8. No.

*Q.* 9. Is it your opinion that we are likely to over-produce pines?

*A.* 9. No.

*Q.* 10. Could you recommend me any books on pineapple culture?

*A.* 10. We have no other literature in this connection.

# Botany.

## LIST OF FRUIT TREES SUITABLE FOR NORTHERN QUEENSLAND.

(Does not include those already commonly grown for the market.)

Alligator Pear
Breadfruit
Jack Fruit
Chinese Raisin
Litchi
Mangosteen
Sapodilla Plum
Star Apple
Vi Apple
Wampee
Rambutan
Butter Fruit or Mabola
Pulassan
Rose Apple
Brazilian Cherry

Most of the above could be obtained from Singapore.

J. F. BAILEY,
Colonial Botanist.

## LIST OF ORNAMENTAL TREES SUITABLE FOR NORTHERN QUEENSLAND.

Exotics.

Albizzio fastigiata, A. Forbesi, A. stipulata.

Bauhinia Candida, B. purpurea, B. splendens, B. variegata.

Cassia fistula (Indian Laburnum), C. nodosa (Golden Chain), C. siamea.

Caesalpinia ferrea

Cinnamomum Camphora (Camphor).

Erythrina caffra, E. indica, E. speciosa (Coral trees).

Ficus benjamina (Weeping Fig).

Harpephyllum caffrum (Natal Plum).

Jacaranda mimosæfolia.

Kigelia pinnata (Sacred Bean of Nubia).

Myrospermum pereirae (Balsam of Peru).

Poinciana regia (Flamboyant Tree).

Natives.

Acacias (a number of species).

Bauhinia Hookeri (Queensland Ebony).

Buckinghamia celsissima.

Castanospermum australe (Moreton Bay Chestnut).

Cupania pseudorhus.

Cypress Pine.

Grevillea robusta (Silky Oak) and other species.

Harpullia pendula (Tulip wood).

Stenocarpus sinuayus (Wheel of Fire).

Sterculia acerifolia (Flame Tree) and other species.

The above list includes those which can be purchased at nurseries within the State, otherwise there are numerous other trees which could be recommended.

# Science.

## AIR IN THE SOIL AND EARTHWORMS.

By BENJAMIN WILSON.

Loose soil is a mixture of (1) solid constituents, (2) water, (3) air. It is the last named that we will deal with. Air in the soil is a most important point not considered by many people, though it is absolutely necessary to the successful growth of the crops. All living subterranean parts, like all other living parts, require air (oxygen) for breathing. Only such plants as have large air spaces, connected by passages, can thrive in soil deficient in air—for instance, in very wet soil where the ground water is at the surface. All other plants would die through suffocation. The reason for this is that alcoholic fermentation and the evolution of carbon dioxide is set up, with the inevitable result of death and putrefaction. In soils poor in oxygen, decomposition takes place in a totally different manner from that in aerated soils; humic acids are formed in great quantities, so that the soil becomes sour. Air in the soil differs slightly in composition from that in the atmosphere; it contains more carbon dioxide and less oxygen, particularly so in the subsoil, because of the respiration of subterranean organs, bacteria and animals, and the decomposition of organic bodies. The amount of carbon dioxide varies with the quantity of organic matter in the soil, the crop, the method of cultivation, the contour and humidity of the land, the size of the soil particles, the depth of soil, and the temperature (season).

The aeration of soil depends essentially upon the structure; the more porous and loose the soil is the more complete is the aeration. Natural factors and artificial factors (cultivation) that assist this aeration are many and varied. As these factors are almost universally known, we need not mention them. One natural factor, however, that has a great connection with aeration, and to which the average person is not inclined to place much credit, is the earthworm. Earthworms play special roles in ordinary soil. The role that concerns us here is: By the tunnelling carried out, and the passages made, due to their activity, they render the soil more porous and better aerated. In other words, the soil becomes mellow, thus promoting breathing in the roots and, consequently, growth in the crops. The excrement deposited likewise serves to render the soil more pliable and porous. They also facilitate drainage. The effect of these animals will be patent to anyone if he can realise that it has been calculated that there may be as many as 400,000 in 2½ acres of land. By admitting air to the soil, more plant food is made available, the soil is made warmer, drainage assisted, the soil broken up, breathing promoted, and in fact a large number of definite advantages arising from admitting air, and which will be seen by anyone who pays a little attention to the matter.

# Entomology.

## EXPERIMENTS IN THE DESTRUCTION OF THE CANE BEETLE.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. E. Jarvis, Entomologist to the Bureau:—

As a result of certain field experiments conducted during November and December last, acetylene light was proved to be very attractive to both sexes of our principal cane beetles throughout their aerial existence, such reaction, however, being considerably influenced by various meteorological and other conditions.

The movements of the beetles whilst flying near artificial light were studied, particularly their manner of approaching the trap and behaviour when within a foot or so of the flame; and certain conclusions were arrived at regarding the kind of design most likely to produce a serviceable light trap, and the conditions under which the latter might be expected to yield payable results. As an outcome of these observations, it is proposed to construct an entirely new form of trap for trial during the coming season. Such contrivances usually aim at capturing the insects by means of a shallow tray or pan containing water and kerosene placed under a strong lamp. This principle, however, is not to be commended in the present instance for the following reasons. In the first place, it entails needless labour and expense, which, although small, would nevertheless be appreciable when dealing with a number of traps. Secondly, it would destroy a certain proportion of useful insects, both parasitic and predaceous, which help to control not only the cane beetle in question but a number of other insects pests of sugar cane.

In this connection I may mention that a well-known enemy of cane grubs (*Dielis formosus*), the common "Digger Wasp," and probably beneficial cockroach (*Ellipsidion pellucidus*, Brunn.) which frequents the foliage of sugar cane, are susceptible to the influence of artificial light. An arboreal species of earwig also, which I believe to be predaceous on small lepidopterous larvæ of at least one of our cane pests, is attracted in great numbers.

The grey-backed cockchafer (*Lepidiota alborhirta*) responds to the stimulus induced by acetylene light from a considerable distance, the phototropic influence being well-nigh irresistible, and compelling this insect to advance towards the trap. It rarely flies directly into the flame, but when within a few yards approaches in an erratic manner by a series of short flights, settling at brief intervals on the ground or on cane plants, and finally, as though struggling against the attractive force, plunging headlong downwards at a distance of about a foot or eighteen inches from the light. Our new trap will be fitted with a landing stage

designed to take advantage of the above habit and immediately capture all beetles that may settle or fall upon it and deposit them in a large chamber from which return will be impossible. Suitable exits will, of course, be provided for useful insects such as carabidæ (predaceous ground beetles) and the various hymenopterous parasites.

The light will be protected in such manner as to throw beetles that may attempt to dash into it on to the stage below, to their certain doom, but at the same time prevent the destruction of beneficial species.

By making use of a discovery relating to a peculiar habit connected with the flight of this insect when taking to wing, it will be a simple matter to prevent cane beetles from flying out of the trap.

Recent experiments with regard to the control of *Lepidiota albohirta* whilst in its larval form have for the most part given negative results, but although apparently inconclusive such work in reality serves a useful purpose by directing investigations into more and still more promising channels which, owing to this gradual process of contraction, must eventually come to focus somewhere, and in all probability reveal a pathway to discoveries of decided economic value.

Whilst stationed at Gordonvale, I have sought to embrace present opportunities for studying the life-history and economy of many insect pests of sugar cane, the majority of which, although of minor importance, include a few decidedly injurious species and several hitherto undescribed forms. Such knowledge is essential to a comprehensive survey of the cane-grub problem, it being, of course, quite possible to advocate control methods that, whilst successful against one kind of pest, may destroy certain natural enemies of another, and so tend to favour an abnormal increase of the latter species.

## OIL OF GERANIUM.

Essential oil of geranium is the product of the steam distillation of the leaves and flower of species of pelargonium (*n. o.* Geraniaceæ).

French oil of geranium is obtained from *P. radula*, Algerian oil from *P. roseum* and *P. odoratissimum*.

Various forms of still are used, and inquirers are referred for particulars of these to works dealing specially with the subject of essential oil distillation. Brant's "Practical Treatise on Animal and Vegetable Fats and Oils" may be consulted.

Essential oil of geranium prior to the present war was quoted at from 15s. to 30 per lb. for various grades, the value being based, probably, on geraniol content.

It is pointed out that no operation of essential oil extraction upon a small scale can be expected to compete successfully in the production of an oil which forms the product of a specialised industry in other parts of the world.

# General Notes.

## A NEW USE FOR PRICKLY-PEAR.

The American Consul in Uruguay says that, when travelling through certain parts, one's attention is attracted to the fine white colour of the farm buildings, even during the wet season. To obtain this neat effect a whitewash is used which is made from the sliced "leaves" of the prickly-pear, macerated in water for twenty-four hours, producing a solution of creamy consistence. To this lime is added and well mixed. When applied to any surface, be it wood, brick, iron, or other material, a beautiful pearly white appearance is produced, which will endure through storms and frosts for many years.

## SPLIT PEAS.

"Woodford Marrow" and "Prizetaker" are used for split peas. They should be planted in drills like other peas, and should be sown as a winter crop, say from May to July, and reaped in Spring, before the heat is too great.

## CUBIC CONTENTS OF A TANK.

A correspondent at Yelarbon sends the following dimensions of a tank—Top, 107 ft. by 61 ft.; bottom, 68 ft. by 36 ft.; depth, 8 ft.—and asks for the cubic content. Mr. A. Morry, surveyor to the Department, advises as follows:—

"The Prismoidal formula is—Add together the area of the top and bottom, and four times the middle area. Then divide the whole by six, which gives the mean area. Then divide by 27, which gives cubic yards. In this case the following is the result:—

Area of top = 107 × 61 = 6,527·0
Area of bottom = 68 × 36 = 2,488·0
4 times area of middle = 876 × 48·6 = 16,878·0
6)25,853·0
4308·10 = mean area in superficial feet.

Then 4308·10 sup. feet × 8 (the depth) and divided by 27 gives $1276\frac{2}{3}$ cubic yards.

Note.—The middle area is obtained by adding together the length at top and bottom and dividing by 2, and the width at top and bottom, also divided by two. Then multiply the two results together—

107 61
65 36
2)175 2)97

87·6 × 48·6 = the middle area.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR AUGUST, 1915.

| Article. | | AUGUST. Prices. |
|---|---|---|
| Bacon | lb. | 11d. to 1s. 0½d. |
| Bran | ton | £9 10s. |
| Broom Millet | „ | £37 to £40 |
| Butter | cwt. | 156s. |
| Chaff, Mixed | ton | £11 5s. to £13 |
| Chaff, Oaten | „ | £13 3s. |
| Chaff, Lucerne | „ | £17 to £17 10s. |
| Chaff, Wheaten | „ | £4 10s. to £5 5s. |
| Cheese | lb. | 11d. to 11½d. |
| Flour | ton | £20 5s. |
| Hams | lb. | 1s. to 1s. 1½d. |
| Hay, Oaten | ton | £12 10s. |
| Hay, Lucerne | „ | £6 to £7 |
| Honey | lb. | 3½d. to 4d. |
| Maize | bush. | 4s. 10d to 5s. 3d. |
| Oats | „ | 6s. 6d. |
| Onions | ton | £10 10s. |
| Peanuts | lb. | 3d. to 4d, |
| Pollard | ton | £9 10s. |
| Potatoes | „ | £5 to £11 |
| Potatoes (Sweet) | cwt. | 1s. 9d. to 5s. 10d. |
| Pumpkins | ton | £4 15s. to £5 15s. |
| Eggs | doz. | 11d. to 1s. 1d. |
| Fowls | pair | 3s. 6d. to 5s. 6d. |
| Ducks, English | „ | 2s.6d. to 4s. |
| Ducks, Muscovy | „ | 4s. to 5s. |
| Geese | „ | 6s. to 7s. |
| Turkeys (Hens) | „ | 6s. 10d. to 7s. 6d. |
| Turkeys (Gobblers) | „ | 12s. to 15s. |
| Wheat | bush. | 8s. 2d, |

### VEGETABLES.

| | |
|---|---|
| Cabbages, per dozen | 1s. to 3s. 6d. |
| Cauliflowers, per dozen | 2s. to 7s. 6d. |
| Beans, per sugar bag | 1s. 6d. to 3s. 6d. |
| Beetroot, per dozen bunches | 6d. to 9d. |
| Carrots, per dozen bunches | 9d. to 1s. |
| Chocos, per quarter-case | 1s. 9d. to 2s. 6d. |
| Cucumbers, per dozen | ... |
| Custard Marrows, per dozen | 1s. 6d. to 4s. 6d. |
| Vegetable Marrows, per dozen | 1s. 6d. to 4s. 6d. |
| Lettuce, per dozen | .. |
| Peas, per sugar bag | 1s. 9d. to 3s. 6d. |
| Celery, per dozen bunches | 1s. 3d. to 1s. 6d. |
| Sweet Potatoes, per cwt. | 4s. |
| Table Pumpkins, per cwt. | 5s. |
| Tomatoes, per quarter-case | 3s. to 6s. 9d. |
| Turnips, per dozen bunches | 6d. to 9d. |
| Rhubarb, per bundle | 1s. to 1s. 6d. |

## SOUTHERN FRUIT MARKETS.

| Article. | AUGUST. Prices. |
|---|---|
| Bananas (Queensland), per case | 14s. to 18s. |
| Bananas (Fiji), per case | 23s. |
| Bananas (G.M.), per case | 22s. 6d. to 23s. |
| Mandarins, per case | 3s. to 7s. |
| Oranges (Navel), per case | 4s. 6d. to 6s. |
| Oranges (other), per case | 3s. to 5s. |
| Passion Fruit, per quarter-case | 2s. to 9s. 6d. |
| Lemons, per bushel case | 3s. to 5s. 6d. |
| Papaw Apples, per half-case | ... |
| Pineapples (Queens), per case | 5s. to 8s. |
| Pineapples (Ripleys), per case | 4s. to 4s. 6d. |
| Pineapples (Common), per case | 4s. to 4s. 6d. |
| Strawberries (Queensland) per tray | 3s. to 4s. 6d. |
| Tomatoes, per quarter-case | 3s. to 8s. |
| Cucumbers, per case | 6s. to 8s. 6d. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | AUGUST. Prices. |
|---|---|
| Apples (Tasmanian), per case | 9s. to 10s. 6d. |
| Apples, Cooking, per case | 6s. to 7s. 6d. |
| Bananas (Cavendish), per dozen | 3d. to 4d. |
| Bananas (Sugar), per dozen | 3½d. to 4d. |
| Cocoanuts, per sack | 12s. to 15s. |
| Custard Apples, per quarter-case | 4s. to 5s. |
| Granadillas, per quarter-case | ... |
| Lemons (Lisbon), per case | 4s. to 6s. |
| Limes (Choice), per quarter-case | 2s. to 3s. 6d. |
| Mandarins, per half-case | 2s. to 7s. 6d. |
| Oranges (Navel), per case | 5s. 6d. to 6s. 6d. |
| Oranges (other), per case | 3s. to 3s. 6d. |
| Papaw Apples, per quarter case | 9d. to 2s. 6d. |
| Passion Fruit, per case | 6s. to 9s. |
| Peanuts, per pound | 3d. to 4d. |
| Rosellas, per sugar bag | ... |
| Pineapples (Ripley), per dozen | 1s. 3d. to 3s. |
| Pineapples (Rough), per dozen | 6d. to 1s. 3d. |
| Pineapples (Smooth), per dozen | 2s. 9d. to 3s. |
| Strawberries, per dozen pint boxes | 3s. 6d. to 9s. 3d. |
| Strawberries, per tray | 1s. 6d. to 2s. |
| Tomatoes, per quarter-case | 2s. to 5s. 6d. |

## TOP PRICES, ENOGGERA YARDS, JULY, 1915.

| Animal. | JULY. Prices. |
|---|---|
| Bullocks ... ... ... ... ... ... ... ... | £19 10s. to £21 12s. 6d. |
| Bullocks (single) ... ... ... ... ... ... ... | £31 10s. |
| Cows ... ... ... ... ... ... ... ... | £14 5s. to £17 5s. |
| Merino Wethers ... ... ... ... ... ... ... | 40s. |
| Crossbred Wethers ... ... ... ... ... ... | 51s. 3d. |
| Merino Ewes ... ... ... ... ... ... ... | 36s. |
| Crossbred Ewes ... ... ... ... ... ... ... | 46s. 6d. |
| Lambs ... ... ... ... ... ... ... ... | 40s. 6d. |
| Pigs (Porkers) ... ... ... ... ... ... ... | 45s. |

## LONDON QUOTATIONS.

London, 1st August.

Danish butter is quoted at 170/ to 174/ per cwt.

The market for frozen rabbits is steady and prices unchanged.

The Liverpool quotation for middling American cotton, August-September shipment, is 5·38d. per lb.

Jute, August shipment, from Calcutta, £23/10/ per ton.

Hemp, August-October shipment, £32.

Copra, South Sea, August-September shipment, £22/5/.

Raw linseed oil, spot pipes, £25 per ton.

Rubber, fine, hard Para, 2/4⅛ per lb.; plantation, first latex crepe, 2/5⅛; smoked sheet, 2/4⅞.

Hemp, sisal. No quotation owing to stoppage of shipments from Mexico. Probable from £38-£40 per ton.

# Answers to Correspondents.

## THE NUBIAN GOAT.

"ENQUIRER"—

We are informed that the Nubian goat is not at present obtainable in Queensland. You would have to import from Nubia, *viâ* Suakin, on the Red Sea, or Suez.

R. B. PORTER, Calbra.—

See reply to "Enquirer."

# TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

(From which those at places west of Brisbane can be reckoned.)

COMPUTED BY D. EGLINTON, F.R.A.S.

| Date. | SEPTEMBER. | | OCTOBER. | | NOVEMBER. | | DECEMBER. | |
|---|---|---|---|---|---|---|---|---|
| | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·4 | 5·33 | 5·30 | 5·47 | 4·59 | 6·4 | 4·46 | 6·27 |
| 2 | 6·3 | 5·33 | 5·29 | 5·48 | 4·58 | 6·4 | 4·46 | 6·28 |
| 3 | 6·2 | 5·34 | 5·28 | 5·48 | 4·58 | 6·5 | 4·46 | 6·28 |
| 4 | 6·1 | 5·34 | 5·27 | 5·49 | 4·57 | 6·6 | 4·46 | 6·29 |
| 5 | 6·0 | 5·35 | 5·26 | 5·49 | 4·57 | 6·6 | 4·46 | 6·29 |
| 6 | 5·59 | 5·35 | 5·25 | 5·50 | 4·56 | 6·7 | 4·46 | 6·30 |
| 7 | 5·58 | 5·36 | 5·24 | 5·50 | 4·55 | 6·8 | 4·46 | 6·30 |
| 8 | 5·57 | 5·36 | 5·23 | 5·51 | 4·54 | 6·9 | 4·47 | 6·31 |
| 9 | 5·56 | 5·37 | 5·22 | 5·51 | 4·53 | 6·10 | 4·47 | 6·32 |
| 10 | 5·55 | 5·37 | 5·21 | 5·52 | 4·53 | 6·11 | 4·47 | 6·33 |
| 11 | 5·53 | 5·38 | 5·20 | 5·52 | 4·52 | 6·11 | 4·47 | 6·34 |
| 12 | 5·52 | 5·38 | 5·19 | 5·53 | 4·51 | 6·12 | 4·47 | 6·35 |
| 13 | 5·50 | 5·38 | 5·18 | 5·53 | 4·51 | 6·12 | 4·48 | 6·36 |
| 14 | 5·49 | 5·39 | 5·17 | 5·54 | 4·50 | 6·13 | 4·18 | 6·36 |
| 15 | 5·48 | 5·39 | 5·16 | 5·54 | 4·50 | 6·14 | 4·48 | 6·37 |
| 16 | 5·46 | 5·40 | 5·15 | 5·55 | 4·49 | 6·15 | 4·49 | 6·38 |
| 17 | 5·45 | 5·40 | 5·14 | 5·55 | 4·49 | 6·16 | 4·49 | 6·38 |
| 18 | 5·44 | 5·41 | 5·13 | 5·56 | 4·48 | 6·16 | 4·50 | 6·39 |
| 19 | 5·43 | 5·41 | 5·12 | 5·56 | 4·48 | 6·17 | 4·50 | 6·39 |
| 20 | 5·42 | 5·42 | 5·11 | 5·57 | 4·48 | 6·18 | 4·51 | 6·40 |
| 21 | 5·41 | 5·42 | 5·10 | 5·57 | 4·48 | 6·19 | 4·51 | 6·40 |
| 22 | 5·40 | 5·43 | 5·9 | 5·58 | 4·47 | 6·20 | 4·52 | 6·41 |
| 23 | 5·39 | 5·43 | 5·8 | 5·58 | 4·47 | 6·21 | 4·52 | 6·41 |
| 24 | 5·37 | 5·44 | 5·7 | 5·59 | 4·47 | 6·21 | 4·53 | 6·41 |
| 25 | 5·36 | 5·44 | 5·6 | 5·59 | 4·47 | 6·22 | 4·53 | 6·42 |
| 26 | 5·35 | 5·45 | 5·5 | 6·0 | 4·47 | 6·23 | 4·54 | 6·42 |
| 27 | 5·33 | 5·45 | 5·4 | 6·0 | 4·47 | 6·24 | 4·54 | 6·42 |
| 28 | 5·32 | 5·46 | 5·3 | 6·1 | 4·47 | 6·25 | 4·55 | 6·43 |
| 29 | 5·31 | 5·46 | 5·2 | 6·1 | 4·47 | 6·26 | 4·55 | 6·43 |
| 30 | 5·30 | 5·47 | 5·1 | 6·2 | 4·47 | 6·27 | 4·56 | 6·44 |
| 31 | ... | ... | 5·0 | 6·3 | ... | ... | 4·56 | 6·44 |

## PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 2 Sept. | ☽ | Last Quarter | 12 | 56 | a.m. |
| 9 „ | ● | New Moon | 8 | 52 | p.m. |
| 16 „ | ☾ | First Quarter | 5 | 21 | „ |
| 23 „ | ○ | Full Moon | 7 | 35 | „ |

The moon will be at its least distance from the earth, roughly about 226,000 miles, on 11th September; and at its greatest distance, about 252,000 miles, on 2nd and 30th September.

| | | | | | |
|---|---|---|---|---|---|
| 1 Oct. | ☽ | Last Quarter | 7 | 44 | p.m. |
| 9 „ | ● | New Moon | 7 | 42 | a.m. |
| 15 „ | ☾ | First Quarter | 11 | 51 | p.m. |
| 23 „ | ○ | Full Moon | 10 | 15 | a.m. |
| 31 „ | ☽ | Last Quarter | 2 | 39 | p.m. |

The moon will be at its least distance from the earth on 11th October, and at its greatest distance on the 27th.

| | | | | | |
|---|---|---|---|---|---|
| 7 Nov. | ● | New Moon | 5 | 52 | p.m. |
| 14 „ | ☾ | First Quarter | 9 | 3 | a.m. |
| 22 „ | ○ | Full Moon | 3 | 36 | „ |
| 30 „ | ☽ | Last Quarter | 8 | 10 | „ |

The moon will be at its least distance from the earth at midnight on 8th November, and at its greatest distance on the morning of the 24th.

| | | | | | |
|---|---|---|---|---|---|
| 7 Dec. | ● | New Moon | 4 | 3 | a.m. |
| 13 „ | ☾ | First Quarter | 9 | 38 | p.m. |
| 25 „ | ○ | Full Moon | 10 | 52 | „ |
| 29 „ | ☽ | Last Quarter | 10 | 59 | „ |

The moon will be at its least distance from the earth on the morning of 7th December, and at its greatest distance on the morning of the 21st.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 17 m., 28 m., 36 m., and 47 minutes, respectively, later than at Brisbane at this time of the year.

At Roma, on 1st September, the sun will rise about 6·19 and set about 5·51; on 1st October it will rise about 5·46 and set at about 6·4; on 1st November it will rise about 5·18 and set at about 6·20; on 1st December it will rise about 5·7 and set at about 6·41.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed by D. Eglinton, F.R.A.S., and should not be reproduced without acknowledgment.]

# Farm and Garden Notes for October.

FIELD.—With the advent of warmer weather and the consequent increase in the soil temperature, weeds will make great headway if not checked; therefore our advice for last month holds good with even greater force for the coming month. Earth up any crops which may require it, and keep the soil loose among them. Sow maize, sorghum, setaria, imphee, prairie grass, panicum, pumpkins, melons, cucumbers, marrows. Plant sweet potatoes, yams, peanuts, arrowroot, turmeric, chicory, and ginger. Coffee plants may be planted out. There are voluminous articles in previous journals giving full instructions how to manage coffee plants, from preparing the ground to harvesting the crop, to which our readers are referred. The planting of the sisal agave and the fourcroya may be proceeded with at any time of the year, but the best time is in spring and beginning of summer, when warm weather and good showers will enable the young plants to root quickly and become firmly established before the winter. The demand for the fibre is constantly increasing, and the supply does not nearly overtake the demand; hence prices keep high, and the outlook for the future is very promising. See our instructions in "The Sisal Industry in Queensland," obtainable free by intending planters on application to the Under Secretary, Department of Agriculture and Stock. Plant only on dry or well-drained soil. Cotton may still be sown.

KITCHEN GARDEN.—Our notes for this month will not vary much from those for September. Sowings may be made of all kinds of vegetables. We would not, however, advise the sowing of cauliflowers, as the hot season fast approaching will have a bad effect on their flowering. French beans, including butter beans, may be sown in all parts of the State. Lima and Madagascar beans should also be sown. Sow the dwarf Lima beans in rows 3 ft. apart with 18 in. between the plants. The kitchen garden should be deeply dug, and the soil reduced to a fine tilth. Give the plants plenty of room, both in sowing and transplanting, otherwise the plants will be drawn and worthless. Thin out melon and cucumber plants. Give plenty of water and mulch tomato plants planted out last month. Asparagus beds will require plentiful watering and a good top-dressing of short manure. See our instructions in "Market Gardening," obtainable on application to the Under Secretary, Department of Agriculture and Stock. Rosella seeds may be sown this month. No farm should be without rosellas. They are easily grown, they bear heavily, they make an excellent preserve, and are infinitely preferable to the mulberry for puddings. The bark supplies a splendid tough fibre for tying up plants. The fruit also makes a delicious wine.

FLOWER GARDEN.—The flower garden will now be showing the result of the care bestowed upon it during the past two months. The principal

work to be done this month is the raking and stirring of the beds, staking, shading, and watering. Annuals may be sown as directed for last month. Plant chrysanthemums, gladiolus and other bulbs, such as tuberose, crinum, ismene, amaryllis, pancratium, hermocallis, hippeastrum, dahlias, &c. Water seedlings well after planting, and shade for a few days. Roses should now be in full bloom. Keep free from aphis, and cut off all spent flowers. Get the lawn-mower out and keep the grass down. Hoe the borders well, and trim the grass edges.

# Orchard Notes for October.

## THE SOUTHERN COAST DISTRICTS.

As October is often a dry month throughout the greater part of the State, one of the most important duties of the fruit-grower is to keep his orchard or vineyard in a thorough state of cultivation, thus retaining the moisture in the soil that is essential to the setting and development of the fruit crop. As long as the land is level one cannot over-cultivate, as there is no danger of the soil washing, but when the orchard is on a hillside heavy thunderstorms, which may occur during the month, are very apt to cause heavy washaways of soil if the land is kept in the high state of tilth necessary to retain moisture. In this case the cultivation should always be across and not up and down the face of the hill, and where the soil is of such a nature that it will wash badly thin blocks, consisting of a row or two of a growing crop or of light timber, brushwood, or even a body of weeds or heavy mulching, should be provided, such blocks to follow the contour of the orchard. If dry, and water for irrigation is available, citrus trees will be the better for a thorough watering during the month. Give the trees a good soaking, and follow the irrigation by systematic cultivation, as this is much better than constant surface watering, as practised by the Chinese. Examine the orchard and vineyard carefully for pests of all kinds. When young trees are showing signs of scale insects, cyanide same; when leaf-eating insects of any kind are present, spray the plants that are being attacked with arsenate of lead. Look out carefully for black spot and oidium in grape vines, using Bordeaux mixture for the former and sulphur for the latter. When using sulphur, see that you get a fine sample—viz., one in which the particles of sulphur are in a very fine state, as the finer the sulphur the better the results. Do not apply the sulphur in the early morning, but during the heat of the day, as it is the sulphur fumes, not the sulphur, which do the good. A knapsack sulphurer is the best machine for applying sulphur to grape vines, trees, or plants.

Examine any late citrus fruits or early summer fruits for fruit-fly, and take every precaution to keep this great pest in check now, as, if

fought systematically now, it will not do anything like the same amount of damage later on as if neglected and allowed to increase unchecked. October is a good month for planting pineapples and bananas. Be sure and have the land properly prepared prior to planting, especially in the case of pineapples, as the deeper the land is worked and the better the state of tilth to which the surface soil is reduced the better the results, as I am satisfied that few crops will pay better for the extra work involved than pines.

## TROPICAL COAST DISTRICTS.

As the fruit-fly usually becomes more numerous at this time of year, especial care must be taken to examine the fruit thoroughly prior to shipment, and to cull out all fruit that has been attacked by the fly. Banana and pineapple plants may be set out, and the orchards should be kept well tilled, so as to have the land clean and in good order before the heavy summer growth takes place.

All the spring crops of citrus fruits should be now marketed, and the trees, where necessary, should be pruned and sprayed, and the land be well ploughed. The ploughing should be followed by harrowing and cultivating, so as to get the surface of the land in good order. Granadillas and papaws should be shipped to the Southern markets, as, if care is taken in packing and they are sent in the cool chamber, they will carry in good order. These fruits should not be gathered in an immature condition, as, if so, they will never ripen up properly. They should be fully developed but not soft, and if gathered in this condition, carefully handled, and packed and shipped in cool storage, they will reach the Southern markets in good condition, and, once they become commonly known, will meet with a ready sale.

## SOUTHERN AND CENTRAL TABLELANDS.

In the Stanthorpe district the spraying of apple, pear, and quince trees for codling moth will have to be carefully carried out, the best spray being arsenate of lead, of which there are several reliable brands on the market.

When fungus diseases, such as powdery mildew, &c., are also present, Bordeaux mixture should be combined with the arsenical spray.

The vineyard will require considerable attention, as the vines must be carefully disbudded, and any signs of oidium or black spot should be checked at once. Look out for late spring frosts, and, if possible, try the effect of smudge fires producing dense smoke for preventing any damage.

Keep the orchards and vineyards well cultivated, as it is of the utmost importance to keep the moisture in the soil at this time of the year if a good fruit crop is to be secured.

In the warmer districts cultivation is all-important, and when irrigation is available it should be used for both fruit trees and vines, a thorough soaking followed by systematic cultivation being given.

QUEENSLAND AGRICULTURAL JOURNAL

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# Agriculture.

## SOURCES OF PLANT FOOD.

BY C. B. WELSH, F.R.H.S., Sunnybank.

Amongst those whose occupation consists in the intensive cultivation of the land, the question is constantly being asked, "How can I retain the complete fertility of the soil?" To those living near town, stable manure was a source of supply; but, with the rapidly increasing motor traffic, stable manure is fast becoming difficult to obtain in sufficient quantities. To the market gardener and fruit-grower it is not in many cases practicable or convenient to keep sufficient stock as a source of manure for his land; but manure the grower must have, or the fertility of his soil will soon be reduced and its cropping ability diminish.

Artificial fertilisers can be used to supply deficient plant foods, but they cannot supply humus, which forms the basis of all successful

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manuring. The value of stable and farmyard manures—although they contain all the elements of a plant's nutrition (viz., nitrogen, potash, and phosphoric acid), in more or less available form—consists in the amount of humus they supply to the soil which they help to build up. Humus is not exactly a direct plant food, but it supplies the ideal rooting medium for plant life. By its decay all the constituents of plant food are rendered available and the plant is enabled to make a perfect growth. Humus possesses other available properties which must not be overlooked, for by its decay vegetable acids are formed which are powerful in attacking dormant plant food in the soil, and so bring it into a condition suitable for the plant to absorb.

Generally, peaty soils and fen land contain sufficient humus; but it is of such an acid nature that a good system of drainage must be adopted, and the addition of lime is required to sweeten it.

The physical effects of humus upon the texture and water-holding capacity of the soil are most important, for it has been proved that a soil containing a stock of humus has during a dry spell produced better yields of crops than a soil rich in fertilisers, but deficient in humus. The water-retaining capacity of a soil rich in humus is from three to four times greater than that of a soil devoid of humus.

If we were to treat a sandy soil with plentiful dressings of farmyard manure or organic matter, in time, instead of the soil running through the fingers as through a sieve, it would be moist enough to hold together in a little ball. Just the opposite action takes place when a stock of humus is built up in a heavy clay soil, for, in a short time, the heavy soil becomes porous and friable; it is easier to work, and is also warmer in winter and cooler in summer, or, I should say, a more uniform soil temperature is maintained.

Another good and necessary purpose humus serves is, to encourage life in the soil. A sterile or dead soil will produce nothing; we must have a living soil, for, if a soil is to be fertile, it must contain millions of living workers called "bacteria." These microscopic organisms play a most important part in the nutrition of plants, and much scientific study has been given to their action in the soil.

The chief object sought after in manuring is to increase the supply of food in a form in which it can be used to make inert plant food available, so that plants may produce their maximum yield of crops. Farmyard manure can only be classed as a slow manure, and some of the undigested residues will remain in the soil for a considerable time before they become available as plant food, and, were it not for the valuable humus which it goes to build up in the soil, it is questionable whether it would pay to use it when we consider the extra expensive labour involved in cartage and spreading.

When such crops as cabbage and cauliflower and crops for green feed as oats, barley, maize are being grown, and potash and phosphoric acid not lacking in the soil, I know of no better fertiliser to use than nitrate of soda for quick returns. It is simply marvellous the rapid action it has if applied, at the rate of ½ lb. to 20 square yards, or 1 to

2 cwt. to the acre, to young cabbage just prior to hearting, in and during showery weather, or before the crop is watered by means of irrigation; the cabbage will be ready for market two or three weeks earlier. Care should be taken when sowing nitrate of soda to prevent it lodging on the foliage of the plants, as it is injurious to the leaf tissues.

Nitrate of soda should not be used excessively on heavy soils, as, if repeatedly used year after year, it has a very injurious effect on the tilth of the soil, causing it to become sticky and cloggy in wet weather, and on becoming dry the soil sets hard on the crust. This deleterious action is not so apparent in sandy soils, but in such soils it should be used in small applications, because it must be remembered that nitrate of soda is water soluble and is immediately available for food; therefore, what the growing plant is unable to absorb is washed into the subsoil or drainage water and lost, as it is not retained by the soil.

For vegetable-growing, the soil can hardly be too rich, as the foliage and roots form the edible portion. Flowers obtain their colours from minerals in the soil, and it is a mistake to give excessive dressings of fresh farmyard manure, because it produces a rank growth, superfluity of foliage, and a coarse, loose flower. In flower cultivation, the object of attainment is a flower of substance, size, colour, and keeping qualities. At experiments carried out at the New Hampshire Agricultural Station, U.S.A., it was found in carnation culture that bonemeal gave the best results as regards the vigour and keeping quality of the cut blooms. Fowl manure, which is a rich organic manure, when used in excess, gave poor results and was distinctly harmful. Nitrate of soda was most unsatisfactory, as it produced flowers of poor colour and keeping qualities.

In seed-growing, it is usual to limit supplies of food, as by so doing a better quality of seed is produced. Many farmers have no doubt noticed that when a tree is ring-barked it produces an immense crop of seed just prior to its death; also, orange trees, when roots are attacked by rot, produce fruit containing much seed instead of the juicy and luscious product. If an unproductive apple tree, which has been making a surplus of rank growth, owing to excessively rich manuring, be root-pruned, it produces good crops of fruit. It seems to be one of Nature's laws that, if the supply of plant food is checked, the plant expends its energy in producing seed to supply the next generation of plants.

On the seed farms in England and Holland, noted for their supplies of pure, bright, plump seed, it is the usual practice, after selection, to transplant cabbage, cauliflower, root crops, &c., on to land in a good state of cultivation, but not recently manured, and there remain to produce their crop of seed. The best double stocks are grown in flower pots, the restricted root area promoting a better quality of seed. From these observations and facts, we may deduce that dressings of rich nitrogenous manures produce abundance of growth, which is what is required when the foliage is consumed as food. Well-decomposed manures, potash, and phosphoric acid develop the fruit and seed and a well-balanced growth.

A valuable source of manure to those situated where stable manure cannot be obtained, and stock is not kept, is the growing of green crops and ploughing them in. It is surprising what can be done to enrich poor soil in this manner; providing there is depth and easy cultivation, with a good rainfall, it is only a matter of time, and the soil can be built up and humus supplied, for it naturally follows that, as the very essence of food was taken out of the soil to build up the bodies of the plants which form the humus, they are full of nourishment and will, when decomposed, supply the growing generation of crops with the very properties required.

Suitable crops for green manuring are buckwheat, rape, cowpeas, lupins, vetches; the leguminous crops are the most valuable, because the bacteria which develop nodules upon the roots are able to collect the nitrogen from the atmosphere and store it up in the root nodules. All that is necessary in green manuring is to roll the crop, use a plough with a rolling coulter, attach a chain to the beam of the plough just long enough to reach under the mouldboard; as the plough moves along, the chain guides the green stuff under the mouldboard, and it is nicely covered. It is essential to plough under in wet or moist weather and well bury the crop. After ploughing, it is advisable to roll, as this consolidates the soil and excludes air, which hastens the decay of the green crop.

Foul land is quickly cleaned in this manner, as weeds are smothered and have no chance to seed, also the water-retaining capacity of the soil is increased as the store of humus is added to, and the texture of the soil greatly improved. A disadvantage is that more land must be cultivated to permit the time required to grow a green crop. On the ridges and orchards it is the custom to allow weeds to grow to prevent erosion during heavy storms. How much better would it be to grow, say, a crop of cowpeas which could be left to rot on the ground?

---

## COMPLETE FERTILISERS FOR FARM, ORCHARD, AND VEGETABLE GARDENS.

### ONIONS.

A rich light sandy loam is most favourable, but even more clayey loams may be used if limed before cultivation. The soil should be friable and contain plenty of humus or decaying vegetable matter, and must be well drained.

Stable manure should not be used immediately before planting onions, but preferably the year before. An excess of nitrogenous manure may also be injurious to the crop.

Apply per acre, according to the class of soil—

4 to 7 cwt. superphosphate,

1½ to 2 cwt. sulphate of potash or muriate of potash,

1½ to 2½ cwt. nitrolim or sulphate of ammonia,

or the same amounts in lb. to every 43 square yards.

A mixed fertiliser, containing about 7 per cent. of soluble phosphoric acid, 8 per cent. of potash and 4 per cent. of nitrogen, may be used in quantities from 7 to 12 cwt. per acre, or from 7 to 12 lb. per 43 square yards.

## PARSNIPS.

This vegetable requires a rich sandy loam, which must be trenched or ploughed very deeply. An artificial fertiliser similar to the one given for carrots may be used, although the quantity of superphosphate may, with advantage, be slightly increased.

Apply per acre—

4 to 7 cwt. superphosphate;

¾ to 1½ cwt. sulphate of potash;

1½ to 2 cwt. nitrolim, or sulphate of ammonia.

## PASTURE.

Ordinary pasture can be very much improved by the application of artificial fertilisers. In the case of lawns the use of fertilisers becomes imperative, and they are best applied before lawns are top-dressed.

Use, per acre, from 3 to 7 cwt. of a fertiliser, containing 4 to 5 per cent. of nitrogen, 6 to 7 per cent. of available phosphoric acid, and 8 per cent. of potash.

A good mixture for lawns is the following:—

1 cwt. fine bonemeal
1 cwt. superphosphate
1 cwt. nitrate of lime
1 cwt. muriate of potash
} per acre.

or 4 lb. to 6 lb. of this mixture to every 43 square yards.

As a change the following mixture may be used alternately:—

3 cwt. Thomas phosphate
1 cwt. sulphate of potash
1 cwt. dried blood
} per acre.

## PEANUTS.

Peanuts do best on a fairly rich sandy loam, containing plenty of lime.

They may be grown between the rows in young orchards, and the leaves and stalk will give a valuable mulch.

Use a fertiliser containing 8 to 10 per cent. phosphoric acid, 10 per cent. potash and from 1 to 2 per cent. of nitrogen, in quantities up to 6 cwt. per acre, or the following mixture:—

2 to 3 cwt. superphosphate
1 to 1½ cwt. sulphate of potash
1 cwt. meatworks manure (with blood)
} per acre.

## PEAS.

Peas may be grown on almost any kind of soil, but do best on a fairly rich, sandy loam. The fertilisers already recommended for Cow-peas and also for beans may be used for peas.

## POTATOES.

This crop has an extremely wide range, and can be grown almost all over Queensland. Deep, friable, sandy loams, with porous subsoils are most suitable. Heavy soils, and wet, sour, clay soils, must be avoided. The soil should contain a fair amount of humus, and for this reason, potatoes do particularly well in virgin soils. The land must be cultivated deeply.

Well-rotted farmyard manure is one of the best fertilisers for potatoes, and if the heavy amounts (10 to 20 tons per acre) are not available, even small amounts used in connection with artificial fertilisers will be found very beneficial. Potash is the principal constituent of all potato fertilisers.

A complete fertiliser for potatoes should contain 6 to 8 per cent. soluble phosphoric acid, 10 per cent. potash, and 3 per cent. of nitrogen, and should be used in accordance with the quality of the soil, in quantities from 5 to 10 cwt. per acre. It is often advisable to apply phosphoric acid and potash by itself, and the nitrogenous manure as a top-dressing later on.

The following mixed fertiliser can be recommended:—

2 to 4 cwt. superphosphate
1 to 2 cwt. sulphate of potash
1 to 1½ cwt. sulphate of ammonia, or nitrolim or nitrate of lime
} per acre;

and if large amount of stable manure has been applied the amount of nitrogenous manure is cut down to one-half of the above quantity, and applied as a top-dressing at the time of blossoming, and in this case the quick-acting nitrate of lime is to be preferred.

In some cases muriate of potassium, or potassium chloride, gives better results than the sulphate.

## RADISHES.

Radishes require a light rich garden loam, and the crop may be forced with artificial fertilisers, containing 8 per cent. soluble phosphoric acid, 10 per cent. potash and 3 per cent. nitrogen, used at the rate of 6 to 10 cwt. per acre, or 6 to 10 lb. per 43 square yards, or from 2 to 4 oz. per square yard.

The same manure as recommended for lettuce may be used.

## SORGHUM.

Use the fertiliser recommended for corn.

## SPINACH.

The use of well-rotted farmyard manure at the rate of 10 to 12 tons per acre, or 2 to 2½ cwt. for every 43 square yards, is particularly recommended. Lighter dressings of stable manure must be supplemented by artificial fertilisers.

Use, per acre, from 6 to 10 cwt. of a fertiliser containing 6 to 8 per cent. soluble phosphoric acid, 5 to 6 per cent. potash, and 2 per cent. of nitrogen, or use—

4 to 6 cwt. superphosphate
1 to 1½ cwt. sulphate of potash
1 to 2 cwt. nitrolim or nitrate of lime
} per acre.

## SUGAR-CANE.

Sugar-cane is grown on almost any kind of soil on our coastal country, but gives the best returns on our alluvial soils and scrub soils, rich in humus. The same crop is generally grown continuously for a great number of years, and requires therefore proper fertilising with large amounts of artificial manures, in order to maintain the fertility of the land.

Exhausted sugar lands may be worked up again, after lying idle for a few years and allowing lantana to grow, which acts as a very valuable green manure crop, accumulating more particularly large amounts of potash.

A complete fertiliser for sugar-cane should contain about 7 to 8 per cent. each of water soluble phosphoric acid, potash and nitrogen, and should be used at the rate of 4 to 6 cwt. per acre.

The following manuring mixtures can be used, instead of the ready-mixed fertiliser:—

(1.) 2 to 3 cwt. superphosphate
1 cwt. sulphate of potash
2 cwt. nitrolim or sulphate of ammonia
} per acre.

(2.) 3 to 4 cwt. meatworks manure
1 to 1½ cwt. sulphate of potash
1½ cwt. nitrolim or sulphate of ammonia
} per acre.

(3.) 2 to 3 cwt. superphosphate
1 to 1½ cwt. sulphate of potash
1 cwt. nitrolim
1 cwt. nitrate of lime
} per acre,

the nitrate of lime to be applied as a top-dressing.

## SWEET POTATOES.

Sweet potatoes require, like the ordinary potato, a deep sandy loam, with a well-drained subsoil, and the same manurial treatment.

The same applies to other root crops, yams, arrowroot, &c.

# LIST OF DEALERS LICENSED UNDER "THE FERTILISERS ACT OF 1914," AND REGISTERED FERTILISERS FOR THE YEAR 1915.

| Name of Dealer. | Address. | Fertiliser. | Registered Fertiliser Certified to Contain Percentage of: | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Nitrogen as: | | | | | Phosphoric Acid as: | | | Potash. | Fineness. | |
| | | | Nitrate. | Ammonia. | Blood. | Flesh, Offal, Bone. | Unspecified. | Water Soluble. | Citrate Soluble. | Total. | | Fine. | Coarse. |
| Associated Farmers of Queensland, Ltd. | Brisbane .. | Various brands of Fertilisers .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Australian Cooper Fertilisers, Ltd. | Toowoomba .. | Various brands of Fertilisers .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Australian Meat Export Company, Ltd. | Brisbane .. .. | A.M.E. Fertiliser .. .. | .. | .. | 7·0 | | .. | .. | .. | 11·0 | .. | .. | .. |
| Ditto .. .. .. | .. | ditto Dried Blood .. .. | .. | .. | 12·2 | .. | .. | .. | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | ditto Bone Meal .. .. | .. | .. | .. | 4·05 | .. | .. | .. | 24·8 | .. | 26 | 74 |
| Ditto .. .. .. | Townsville .. | ditto Dried Blood .. .. | .. | .. | 12·0 | .. | .. | .. | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | ditto Fertiliser .. .. | .. | .. | 5·5 | | .. | .. | .. | 18·5 | .. | .. | .. |
| Australian Sugar Coy., Ltd. .. | Mourilyan .. | T.C. Fertiliser .. .. | .. | .. | .. | .. | 3·8 | .. | .. | 20·0 | .. | .. | .. |
| Bateman, A. E. .. .. | Stanthorpe .. | Hassell's Potato Manure No. 1 | 2·5 | 2·0 | .. | .. | .. | 12 | .. | 12 | .. | .. | .. |
| Ditto .. .. .. | .. | ditto Lucerne Manure .. | .. | .. | .. | .. | .. | 10·5 | .. | 17·3 | .. | .. | .. |
| Ditto .. .. .. | .. | ditto Pea and Bean Manure | 3·2 | .. | .. | .. | .. | 12 | .. | 15 | .. | .. | .. |
| Ditto .. .. .. | .. | ditto Maize and Cabbage Manure | 2·5 | .. | .. | .. | .. | 15·75 | .. | 16·75 | .. | .. | .. |
| Ditto .. .. .. | .. | ditto No. 1 Superphosphate | .. | .. | .. | .. | .. | 17 | ·5 | 18 | .. | .. | .. |
| Ditto .. .. .. | .. | ditto Tomato Manure (orchard) | 2·38 | .. | .. | ·75 | .. | 11·25 | .. | 13·95 | .. | .. | .. |
| Baxter, H. .. .. .. | Maryborough .. | Mover B (in diamond) Bonedust | .. | .. | .. | 3·5 | .. | .. | .. | 25 | .. | .. | .. |
| Baynes Bros. .. .. .. | Brisbane .. .. | Baynes Brothers' Fertiliser .. | .. | .. | 4·27 | | .. | .. | .. | 19·75 | .. | .. | .. |
| Beatty, T. S. .. .. .. | Mackay .. .. | Crown Brand Sulphate of Ammonia | .. | 20 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ditto .. .. .. | ditto .. .. | ditto Superphosphate | .. | .. | .. | .. | .. | 16 | .. | .. | .. | .. | .. |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ditto .. .. .. | ditto .. .. | ditto Sulphate of Potash | .. | .. | .. | .. | .. | .. | .. | .. | 50 | .. | .. |
| Ditto .. .. .. | ditto .. .. | ditto Cane Manure .. | .. | 4·3 | .. | .. | .. | 7 | .. | .. | 15 | .. | .. |
| Bergl Australia, Ltd. .. .. | Bowen .. .. | Dried Blood .. .. .. | .. | .. | 12·05 | .. | .. | .. | .. | .. | .. | .. | .. |
| Biboorah Meat Export Coy. | .. | .. | .. | .. | 5·69 | | .. | .. | .. | 17·5 | .. | .. | .. |
| Birt and Co., Ltd. .. .. | Brisbane .. .. | Phœnix Fertiliser .. .. | .. | .. | 4·5 | | .. | .. | .. | 18 | .. | .. | .. |
| Ditto .. .. .. | ditto .. .. | ditto Dried Blood .. | .. | .. | 12 | | .. | .. | .. | .. | .. | .. | .. |
| Borthwick and Sons, Ltd. .. | Brisbane .. .. | T.B. & S. (in diamond) Fertiliser | .. | .. | 7·0 | | .. | .. | .. | 13 | .. | .. | .. |
| Brisbane Gas Company .. | Brisbane .. .. | Sulphate of Ammonia .. | .. | 20·98 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Burdekin River Meat Preserving Company, Ltd. | Sellheim .. .. | Burdekin Fertiliser .. .. | .. | .. | 3·3 | .. | .. | .. | .. | 17·44 | .. | .. | .. |
| Burns, Philp, and Co., Ltd. .. | Cairns .. .. | T.B. & S. (in diamond) Fertiliser | .. | .. | 6·0 | | .. | .. | .. | 12 | .. | .. | .. |
| Campbell and Amos, Ltd. .. | Bundaberg .. | Runcorn Bonedust .. .. | .. | .. | .. | 4·25 | .. | .. | .. | 21·85 | .. | 50 | 50 |
| Ditto .. .. .. | .. | Shirley's 7-7-7 .. .. | .. | 7 | .. | .. | .. | 7 | .. | .. | 7 | .. | .. |
| Ditto .. .. .. | .. | ditto Superphosphate .. | .. | .. | .. | .. | .. | 17 | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | ditto No. 3 .. .. | .. | 3·3 | .. | .. | .. | 13 | .. | .. | 2 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 5 .. .. | .. | 3·3 | .. | .. | .. | 12 | .. | .. | 7 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 9 .. .. | .. | 4·1 | .. | .. | .. | 6·5 | .. | .. | 4 | .. | .. |
| Ditto .. .. .. | .. | ditto Sulphate of Ammonia | .. | 20 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | ditto Nitrate of Soda .. | 15·5 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | G.M.W.Q. Meatworks Fertiliser | .. | .. | 6·6 | | .. | .. | .. | 13·1 | .. | .. | .. |
| Central Q.M.E. Coy., Ltd. .. | Lake's Creek .. | Fitzroy Fertiliser .. .. | .. | .. | 5·15 | | .. | ·13 | 8·88 | 16·94 | ·1 | .. | .. |
| Chappel, J. H. .. .. | Charters Towers .. | Q.M.F. Fertiliser .. .. | .. | .. | 5 | | .. | .. | .. | 15 | .. | .. | .. |
| John Cook and Co., Prop., Ltd. | Brisbane .. .. | Redbank Freez. W. Fertiliser | .. | .. | 7·23 | | .. | .. | 10·85 | 11·1 | .. | .. | .. |
| Corser and Co., Ltd. .. .. | Maryborough .. | Shirley's A Bone Phosphate .. | .. | ·5 | .. | .. | .. | .. | .. | 29·8 | .. | .. | .. |
| Ditto .. .. .. | .. | ditto Superphosphate .. | .. | .. | .. | .. | .. | 17 | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | ditto No. 3 Fertiliser .. | .. | 3·3 | .. | .. | .. | 13 | .. | .. | 2 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 5 Fertiliser .. | .. | 3·3 | .. | .. | .. | 12 | .. | .. | 7 | .. | .. |
| Ditto .. .. .. | .. | ditto 7-7-7 Fertiliser .. | .. | 7 | .. | .. | .. | 7 | .. | .. | 7 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 9 Fertiliser .. | .. | 4·1 | .. | .. | .. | 6·5 | .. | .. | 4 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 11 Fertiliser .. | .. | .. | .. | .. | .. | 11·4 | .. | .. | 7 | .. | .. |
| Croker, J. .. .. .. | Mackay .. .. | Hassell's No. 1 Cane Manure .. | .. | 7·7 | .. | .. | .. | 7 | .. | .. | 7·7 | .. | .. |
| Ditto .. .. .. | .. | Q.M.E. Fertiliser .. .. | .. | .. | 6·03 | | .. | .. | 14·76 | 15·81 | .. | .. | .. |
| Ditto .. .. .. | .. | Q.M.E. Dried Blood .. .. | .. | .. | 12·08 | .. | .. | .. | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | Sulphate of Potash .. .. | .. | .. | .. | .. | .. | .. | .. | .. | 53 | .. | .. |
| Ditto .. .. .. | .. | Sulphate of Ammonia .. | .. | 21 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | Nitrate of Soda .. .. | 15·5 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | Superphosphates .. .. | .. | .. | .. | .. | .. | 16·5 | .. | .. | .. | .. | .. |

## LIST OF DEALERS LICENSED UNDER "THE FERTILISERS ACT OF 1914," AND REGISTERED FERTILISERS FOR THE YEAR 1915—*continued.*

| Name of Dealer. | Address. | Fertiliser. | REGISTERED FERTILISER CERTIFIED TO CONTAIN PERCENTAGE OF: | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Nitrogen as: | | | | | Phosphoric Acid as: | | | Potash. | Fineness. | |
| | | | Nitrate. | Ammonia. | Blood. | Flesh, Offal, Bone. | Unspecified. | Water Soluble. | Citrate Soluble. | Total. | | Fine. | Coarse. |
| Croker, J. | Mackay | Shirley's 7-7-7 | .. | 7 | .. | .. | .. | 7 | .. | .. | 7 | .. | .. |
| Ditto | .. | Fitzroy Fertiliser | .. | .. | 5·15 | | .. | ·13 | 8·88 | 16·94 | ·1 | .. | .. |
| Dalgety and Co., Ltd. | Brisbane | Shirley's Superphosphate | .. | .. | .. | .. | .. | 17 | .. | .. | .. | .. | .. |
| Ditto | .. | Hassell's A1 Superphosphate | .. | .. | .. | .. | .. | 16·5 | ·5 | 17·5 | .. | .. | .. |
| Ditto | .. | M.R.C. Japancse Superphosphate | .. | .. | .. | .. | .. | 19·5 | .. | 20·5 | .. | .. | .. |
| Ditto | .. | M.L. (in diamond) Superphosphate | .. | .. | .. | .. | .. | 17 | 1 | 20 | .. | .. | .. |
| Ditto | .. | Runcorn Bonedust | .. | .. | .. | 4 | .. | .. | .. | 21·85 | .. | 52 | 48 |
| Darling Downs Co-operative Bacon Company, Ltd. | Willowburn | Bone and Blood | .. | .. | 7·75 | | .. | .. | 5·56 | 6·82 | .. | .. | .. |
| Decker and Co. | Eagle street, Brisbane | Hassell's Pineapple, Strawberry, and Banana Manure | 3·5 | 3 | .. | .. | .. | 10 | .. | 10 | .. | .. | .. |
| Ditto | .. | ditto Barley and Stone-fruit Manure | 2·7 | .. | .. | 2·05 | .. | 5·5 | .. | 13·7 | .. | .. | .. |
| Ditto | .. | ditto Orchardists' Manure | 2·4 | .. | .. | ·73 | .. | 11·25 | .. | 13·95 | .. | .. | .. |
| Ditto | .. | ditto Maize Manure | 2·5 | .. | .. | .. | .. | 15·75 | .. | 16·75 | .. | .. | .. |
| Ditto | .. | ditto Lucerne Manure | .. | .. | .. | .. | .. | 10·5 | .. | 17·30 | .. | .. | .. |
| Ditto | .. | ditto No. 1 Superphosphate | .. | .. | .. | .. | .. | 16·5 | ·5 | 17·5 | .. | .. | .. |
| Ditto | .. | ditto Pea and Bean Manure | 3·2 | .. | .. | .. | .. | 12·0 | .. | 15·0 | .. | .. | .. |
| Ditto | .. | ditto Potato Manure | 2·5 | 2·0 | .. | .. | .. | 12·0 | .. | 12·0 | .. | .. | .. |
| Early, Mrs. A. B. | Chermside | Q.M.E. Fertiliser | .. | .. | 6·03 | | .. | .. | 14·76 | 15·81 | .. | .. | .. |
| Ditto | .. | Q.M.E. Dried Blood | .. | .. | 12·08 | .. | .. | .. | .. | .. | .. | .. | .. |
| Foggitt, Jones, and Co., Ltd. | Brisbane | "Oxley" Fertiliser | .. | .. | 6·15 | .. | .. | .. | .. | 15·5 | .. | .. | .. |
| Francis, J. V. | Ipswich | *Bonemeal | .. | .. | .. | 2·72 | .. | .. | .. | 25·8 | .. | 30 | 70 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ditto .. .. .. | .. | *Dried Blood .. .. .. | .. | .. | 11·4 | .. | .. | .. | .. | 5·3 | .. | .. | .. |
| Gladstone Meatworks, Ltd. .. | Gladstone .. .. | G.M.W.Q. Fertiliser (cattle) .. | .. | .. | 6·32 | | .. | .. | .. | 13·55 | .. | .. | .. |
| Ditto .. .. .. | .. | ditto Fertiliser (sheep) .. | .. | .. | 6·60 | | .. | .. | .. | 13·10 | .. | .. | .. |
| Gleeson, E. .. .. .. | Stanthorpe .. | Baynes Brothers' Fertiliser .. | .. | .. | 4·27 | | .. | .. | 17·3 | 19·75 | .. | .. | .. |
| Hacker, W. .. .. .. | Chermside .. | Redbank Fertiliser .. .. | .. | .. | 7·23 | | .. | .. | 10·85 | 11·10 | .. | .. | .. |
| Ditto .. .. .. | .. | Q.M.E. Dried Blood .. .. | .. | .. | 12·08 | .. | .. | .. | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | Q.M.E. Fertiliser .. .. | .. | .. | 6·03 | | .. | .. | 14·76 | 15·81 | .. | .. | .. |
| Hamwood, W. E. .. .. | Toowoomba .. | Wattle Brand Bonemeal .. | .. | .. | .. | 2·8 | .. | .. | .. | 19·0 | .. | 35 | 65 |
| Headrick, Ltd. .. .. | Cairns .. .. | Biboorah Fertiliser .. .. | .. | .. | 4·88 | | .. | .. | .. | 13·57 | .. | .. | .. |
| Hutton, J. C., Prop., Ltd. .. | Brisbane .. .. | Hutton's Special Fertiliser .. | .. | .. | 6·17 | | .. | .. | 13·05 | 14·10 | .. | .. | .. |
| Jordan, C. F. .. .. .. | Aspley .. .. | Normanby Bonedust .. | .. | .. | .. | 3·8 | .. | .. | .. | 24·2 | .. | 59 | 41 |
| Lawson, R. B., and Co. .. | Stanthorpe .. | Bonedust .. .. .. | .. | .. | .. | 3·7 | .. | .. | .. | 21·9 | .. | .. | .. |
| Ditto .. .. .. | .. | Shirley's No. 1 Superphosphate | .. | .. | .. | .. | .. | .. | .. | 16·5 | .. | .. | .. |
| Ditto .. .. .. | .. | ditto No. 2 Fertiliser .. | .. | 1·6 | .. | .. | .. | 15 | .. | .. | 1 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 3 Fertiliser .. | .. | 3·3 | .. | .. | .. | 13 | .. | .. | 2 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 5 Fertiliser .. | .. | 3·3 | .. | .. | .. | 12 | .. | .. | 7 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 9 Fertiliser .. | .. | 4·1 | .. | .. | .. | 6·5 | .. | .. | 4 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 11 Fertiliser .. | .. | .. | .. | .. | .. | 11·4 | .. | .. | 7 | .. | .. |
| Ditto .. .. .. | .. | Sulphate of Potash .. .. | .. | .. | .. | .. | .. | .. | .. | .. | 52 | .. | .. |
| Ditto .. .. .. | .. | Nitrate of Soda .. .. | 15·5 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | Sulphate of Ammonia .. | .. | 20 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | Blood and Bone .. .. | .. | .. | 5·5 | | .. | .. | .. | 12 | .. | .. | .. |
| Ditto .. .. .. | .. | Bonedust .. .. | .. | .. | .. | 3·7 | .. | .. | .. | 21·9 | .. | .. | .. |
| Mant, C. O. .. .. .. | Creek St., Brisbane | Alligator Creek Fertiliser .. | .. | .. | 5·75 | | .. | .. | .. | 16·5 | .. | .. | .. |
| Ditto .. .. .. | .. | Redbank Fertiliser .. .. | .. | .. | 7·23 | | .. | .. | .. | 11·1 | .. | .. | .. |
| Nisbet, T. and Co. .. .. | Innisfail .. .. | Shirley's 7-7-7 Fertiliser .. | .. | 7 | .. | .. | .. | 7 | .. | .. | 7 | .. | .. |
| North Queensland Mortgage and Investment Co., Ltd. | Townsville .. | Q.M.E. Fertiliser .. .. | .. | .. | 6·03 | | .. | .. | 14·76 | 15·81 | .. | .. | .. |
| Ditto .. .. .. | .. | Q.M.E. Dried Blood .. .. | .. | .. | 12·08 | .. | .. | .. | .. | .. | .. | .. | .. |
| Paul and Gray, Ltd. .. | Brisbane .. .. | Shirley's Superphosphate .. | .. | .. | .. | .. | .. | 17 | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | ditto No. 0 Fertiliser .. | .. | 2·5 | .. | .. | .. | .. | 9 | 13·7 | 6 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 3 Fertiliser .. | .. | 3·3 | .. | .. | .. | 13 | .. | .. | 2 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 5 Fertiliser .. | .. | 3·3 | .. | .. | .. | 12 | .. | .. | 7 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 7 Fertiliser .. | .. | 1·6 | .. | .. | .. | 11·4 | .. | .. | 1 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 9 Fertiliser .. | .. | 4·1 | .. | .. | .. | 6·5 | .. | .. | 4 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 11 Fertiliser .. | .. | .. | .. | .. | .. | 11·4 | .. | .. | 7 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 14 Fertiliser .. | .. | 2·5 | .. | .. | .. | 5·5 | .. | 14 | 6 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 19 Fertiliser .. | .. | 4·1 | .. | .. | .. | 4·1 | .. | 11·4 | 2 | .. | .. |

## LIST OF DEALERS LICENSED UNDER "THE FERTILISERS ACT OF 1914," AND REGISTERED FERTILISERS FOR THE YEAR 1915—*continued.*

| Name of Dealer. | Address. | Fertilisers. | REGISTERED FERTILISER CERTIFIED TO CONTAIN PERCENTAGE OF: Nitrogen as: Nitrate. | Ammonia. | Blood. | Flesh, Offal, Bone. | Unspecified. | Phosphoric Acid as: Water Soluble. | Citrate Soluble. | Total. | Potash. | Fineness. Fine. | Coarse. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Paul and Gray, Ltd. | Brisbane | Sulphate of Potash | .. | .. | .. | .. | .. | .. | .. | .. | 52 | .. | .. |
| Paxton, W. H., and Co. | Mackay | Various | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Pinder, A. W. | Rockhampton | "P.B. 8" Fertiliser | .. | .. | .. | 1 | .. | 10 | .. | 19·4 | .. | .. | .. |
| Ditto | .. | "P.B. 3" Fertiliser | .. | .. | .. | ·7 | .. | 8·5 | .. | 12·9 | .. | .. | .. |
| Ditto | .. | "P.B. 5" Fertiliser | .. | 4 | .. | ·3 | .. | 5 | .. | 12·8 | .. | .. | .. |
| Pohlmann, J. W. | Doolbi | Bonedust | .. | .. | .. | 3·09 | .. | .. | .. | 24·65 | .. | 60 | 40 |
| Pressler, G. L.; and Grotherr, E. C. | ditto | Bonedust | .. | .. | .. | 2·77 | .. | .. | .. | 25·10 | .. | 72 | 28 |
| Pumpfrey and Kyle | Nundah | Q.M.E. Fertiliser | .. | .. | 6·03 | | .. | .. | 14·76 | 15·81 | .. | .. | .. |
| Queensland Fertiliser Coy., Ltd. | Runcorn | Runcorn Bonedust | .. | .. | .. | 4·25 | .. | .. | .. | 21·85 | .. | 50 | 50 |
| Queensland Fruitgrowers' Industrial Trading Society | Brisbane | Webster's Superphosphates | .. | .. | .. | .. | .. | 16 | .. | .. | .. | .. | .. |
| Ditto | .. | Shirley's Superphosphate | .. | .. | .. | .. | .. | 17 | .. | .. | .. | .. | .. |
| Ditto | .. | ditto No. 3 Fertiliser | .. | 3·3 | .. | .. | .. | 13 | .. | .. | 2 | .. | .. |
| Ditto | .. | ditto No. 5 Fertiliser | .. | 3·3 | .. | .. | .. | 12 | .. | .. | 7 | .. | .. |
| Ditto | .. | Sulphate of Potash | .. | .. | .. | .. | .. | .. | .. | .. | 52 | .. | .. |
| Ditto | .. | Q.M.E. Dried Blood | .. | .. | 12·08 | .. | .. | .. | .. | .. | .. | .. | .. |
| Ditto | .. | Q.M.E. Fertiliser | .. | .. | 6·03 | | .. | .. | 14·76 | 15·81 | .. | .. | .. |
| Ditto | .. | Baynes Brothers' Fertiliser | .. | .. | 4·27 | | .. | .. | .. | 19·75 | .. | .. | .. |
| Ditto | .. | Runcorn Bonedust | .. | .. | 4·25 | | .. | .. | .. | 21·85 | .. | 52 | 48 |
| Ditto | .. | J. C. Hutton's Fertiliser | .. | .. | 6·17 | | .. | .. | .. | 14·10 | .. | .. | .. |
| Ditto | .. | Webster's Sulphate of Ammonia | .. | 20 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ditto | .. | Webster's Sulphate of Potash | .. | .. | .. | .. | .. | .. | .. | .. | 50 | .. | .. |
| Queensland Meat Export and Agency Company, Ltd. | Brisbane | Q.M.E. Fertiliser | .. | .. | 6·03 | | .. | .. | 14·76 | 15·81 | .. | .. | .. |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ditto .. .. .. | .. | Q.M.E. Dried Blood .. .. | .. | .. | 12·08 | .. | .. | .. | .. | .. | .. | .. | .. |
| Rosewarne (Queensland), Ltd. | Brisbane .. .. | Excel Brand Fertiliser .. | .. | .. | 3·88 | | .. | .. | .. | 16·80 | .. | .. | .. |
| Searle. J., and Sons, Ltd. .. | Toowoomba .. | Wattle Brand Bonemeal .. | .. | .. | .. | 2·8 | .. | .. | .. | 10 | .. | 35 | 65 |
| Ditto .. .. .. | .. | Baynes Bros. Fertiliser .. | .. | .. | 4·33 | | .. | .. | .. | 19·33 | .. | .. | .. |
| Taylor, C., and Co. .. .. | Brisbane .. .. | Shirley's Superphosphate .. | .. | .. | .. | .. | .. | 17 | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | ditto No. 3 Fertiliser .. | .. | 3·3 | .. | .. | .. | 13 | .. | .. | 2 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 5 Fertiliser .. | .. | 3·3 | .. | .. | .. | 12 | .. | .. | 7 | .. | .. |
| Ditto .. .. .. | .. | Sulphate of Potash .. .. | .. | .. | .. | .. | .. | .. | .. | .. | 52 | .. | .. |
| Ditto .. .. .. | .. | Mt. Lyall No. 1 Superphosphate | .. | .. | .. | .. | .. | 17 | 1 | 20 | .. | .. | .. |
| Ditto .. .. .. | .. | Redbank Fertiliser .. .. | .. | .. | 6·46 | | .. | .. | .. | 13 | .. | .. | .. |
| Torrens Creek Meat Export Company, Ltd. | Torrens Creek .. | T.C. Fertiliser .. .. | .. | .. | 3·80 | | .. | .. | .. | 20 | .. | .. | .. |
| Trackson Brothers .. .. | Brisbane .. .. | Nitrolim .. .. .. | .. | .. | .. | .. | 18 | .. | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | Nitrate of Lime .. .. | 13 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Tytherleigh, J. .. .. | Woombye .. | Nitrolim .. .. .. | .. | .. | .. | .. | 18 | .. | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | Hutton's Fertiliser .. .. | .. | .. | 6·17 | | .. | .. | 13·05 | 14·10 | .. | .. | .. |
| Ditto .. .. .. | .. | Shirley's Superphosphate .. | .. | .. | .. | .. | .. | 17 | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | Q.M.E. Fertiliser .. .. | .. | .. | 6·03 | | .. | .. | 14·76 | 15·81 | .. | .. | .. |
| Ditto .. .. .. | .. | Q.M.E. Dried Blood .. .. | .. | .. | 12·08 | .. | .. | .. | .. | .. | .. | .. | .. |
| Walker, J. J., and Co. .. | Brisbane .. .. | Torrens Creek Fertiliser .. | .. | .. | 4·40 | | .. | .. | .. | 16·47 | .. | .. | .. |
| Walsh and Co. .. .. | Toowoomba .. | Downs Bac. Co. Gen. Fertiliser | .. | .. | 2·84 | | .. | .. | .. | 14·54 | .. | .. | .. |
| Ditto .. .. .. | .. | Hutton's Fertiliser .. .. | .. | .. | 6·17 | | .. | .. | 13·05 | 14·10 | .. | .. | .. |
| Ditto .. .. .. | .. | Shirley's No. 3 Fertiliser .. | .. | 3·3 | .. | .. | .. | 13 | .. | .. | 2 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 5 Fertiliser .. | .. | 3·3 | .. | .. | .. | 12 | .. | .. | 7 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 1 Superphosphate | .. | .. | .. | .. | .. | 17 | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | ditto No. 9 .. .. | .. | 4.1 | .. | .. | .. | 6·5 | .. | .. | 4 | .. | .. |
| Ditto .. .. .. | .. | Wattle Brand Bonemeal .. | .. | .. | .. | 2·8 | .. | .. | .. | 19·0 | .. | 35 | 65 |
| Webster and Co., Ltd. .. | Brisbane .. .. | Crown Sulphate of Potash .. | .. | .. | .. | .. | .. | .. | .. | .. | 50 | .. | .. |
| Ditto .. .. .. | .. | do. Superphosphate .. | .. | .. | .. | .. | .. | 16 | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | do. Sulphate of Ammonia .. | 20 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Whiteley, D. .. .. | Emu Park .. | Sulphate of Potash .. .. | .. | .. | .. | .. | .. | .. | .. | .. | 52 | .. | .. |
| Ditto .. .. .. | .. | Sulphate of Ammonia .. | 20 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | Nitrate of Soda .. .. | 15·5 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Ditto .. .. .. | .. | Shirley's No. 3 Fertiliser .. | .. | 3·3 | .. | .. | .. | 13 | .. | .. | 2 | .. | .. |
| Ditto .. .. .. | .. | ditto No. 5 Fertiliser .. | .. | 3·3 | .. | .. | .. | 12 | .. | .. | 7 | .. | .. |
| Wood, T. H. .. .. | .. | Bonemeal .. .. .. | .. | .. | .. | 4·07 | .. | .. | .. | 24·2 | .. | 50 | 50 |

## CORN-GROWING CONTEST, 1914-1915.

Following is an example of the Record Chart that was kept by one of the competitors in the corn-growing competition held under the direction of the Department of Agriculture and Stock, which commenced in 1914 and terminated in 1915. Another competition has been arranged for the season 1915-1916 under the same conditions. This chart was kept by an energetic young farmer in the Crow's Nest district, and, had the season been favourable, no doubt his energy would have been rewarded. He has now enlisted in the military forces, so will not be a competitor on this occasion:—

PARTICULARS ABOUT THE PLOT AND ITS PREPARATION.

Nature of Soil—Light, loamy forest soil, between a light black and chocolate colour.

Nature of Subsoil—Sub-soil in places consists of a heavy yellow clay, while other parts are gravelly.

Situation of Plot—Plot runs over the summit of a spur of the range, and slopes to east, south, and west.

Previous Cultivation or History of Plot—Plot has never been cultivated or worked in any way before, and up to this year (1914) has been heavily timbered with green iron-bark saplings, also a fair quantity of dead timber. As a rule, it carries a fair weight of grass, and up to September, 1913, was open to stock. It was then fenced, and from then on was not trodden in any way.

When Preparation of Plot commenced—Preparation commenced on 10th day of August, 1914.

Was Manure applied?—No manure was applied.

How was the Plot Prepared? (Competitors here to state fully how, and when, and why each operation was carried out; the condition of the soil as to moisture and fineness at each stage of working, the implements used, depth of working, difficulties experienced, &c.)—According to general ideas concerning farming, my plot does not stand a very good chance of bringing me in the first prize, as the soil is too new and sour from not having been worked. During the first week we commenced clearing operations in extremely dry and hot weather, but ideal conditions for the work. We stumped out the green saplings with axe and mattock, and burnt out all dry trees and stumps. Having filled up all holes remaining after burning, we intended to wait for rain to make the soil easier to work.

After waiting some little time and still no rain, we came to the conclusion that there was none to come, so decided to break the ground up dry. Accordingly, on Monday, 10th August, 1915, we started ploughing operations with three horses and a Newl-Saunder's improved single-furrow disc plough. The soil worked better than we anticipated, the only fault being that the sods in places would break away right down to the subsoil, making a very uneven furrow for the plough wheel to run in on the following round, and also leaving the ploughed land in a very rough condition.

Of course, we struck the usual collection of roots, stumps, &c., which was only natural; but, as two men followed the plough all the time, any obstruction was soon removed. The only real trouble we encountered was caused by the uneven bed of the furrow, which I have already mentioned. The disc stood the shaking splendidly until, happening to strike a specially rough patch, one of the main bolts broke in halves. Just as luck would have it, we had not another bolt in the place that would fit; so we were completely euchred. We were not beaten, however. So pulling the disc out of the way, we hooked on to a heavy English iron plough, made for the purpose, and finished the field with that.

The ground then lay in that condition for about four months, with scarcely a drop of rain, certainly not enough to soften the clods. A succession of storms early in December, however, had the desired effect, and I got on to the land with the harrows. After six or seven harrowings, the clods broke up sufficiently to allow of cross-ploughing—again with the disc plough. Of course, this was much easier than breaking up, and very little difficulty was experienced. The continued dry, hot spell had one good effect in that it completely killed the roots of the grass which were assisting to bind the soil together, so that after a thorough saturation the clods broke up rather easily.

After cross-ploughing it was harrowed again half-a-dozen times, till the soil was, in a certain measure, fit for planting as regards fineness and moisture. Of course, after breaking up, the soil was in the roughest possible condition and absolutely parched. The depth of ploughing was 5 in. On cross-ploughing, the depth was 6 in., while the sods were now broken up into squares as it were, and beginning to crumble. The ground was fairly moist, but, on account of the rough, open condition, moisture was not retained.

When we commenced planting, parts of the field were in very fair condition, the soil having crumbled up splendidly, while other parts were still very rough. Of course, I claimed the best corner for my plot, and was not refused.

Heavy rain fell during planting operations, so that the condition of the plot as regards moisture can easily be judged.

The only difficulty experienced was in the covering. I reversed the two outside hoes of the scuffler and raised the back one. In this way, by driving the horse in the drill and keeping one of the sides hoes on each side of the drill, both threw the soil inwards and so covered the seed effectively. But in the rough places the clods would jam up around the hoes, making them skid, so that I was continually stopping to clean them. However, I got all the drills covered; and on the 26th December I harrowed the field, and from then on I have been watching the crop grow, and dreaming of what I will do when I win the prize.

## PLANTING.

Condition of Soil as to Moisture at Planting—Corn planted immediately after 1·20 in. of rain had fallen, so that the ground was thoroughly moist.

How was the Seed Sown?—The land was drilled out and the seed planted by hand and covered with a scuffler.

Was any Fertiliser applied?—No.

Was Seed Planted Singly, or in Groups or Hills?—The seed was planted singly.

Distance between Plants or Hills—The seed was planted roughly about 1 foot apart.

Distance between Rows—The distance was not accurately measured, about 4 feet.

Direction of Rows (north and south, or east and west)—Rows planted east and west.

Date of Commencing Planting—Commenced planting on 23rd December, 1914.

Date of Finishing Planting—Finished planting on 24th December, 1914.

Depth of Planting—The seed was planted about 4 in. deep.

## PROGRESS OBSERVATIONS.

Date of First Appearance of Young Plants—First plants appeared on 27th December, 1914.

Time taken before all Plants are up in Rows—All plants up in rows on 30th December—seven days.

Number of Blanks re-seeded—No blanks re-seeded, as corn came up splendidly.

How Cultivated (Competitor to give in the form of a diary full particulars of the operations adopted to break soil crusts, cut out weeds, and keep in moisture)—27th December: First plants showing though. 30th December: All plants up in rows and looking very healthy. 14th January: Rain came and washed some of the plants out—a calamity, as every stalk may count. 18th January: In walking over the plot to-day, I noticed that weeds were coming in places. In this matter the new ground has the advantage as, speaking comparatively, there are scarcely any weeds. However, the few that are there must come out, as the weather is very hot and the moisture soon goes. 19th January: Commenced scuffling to-day with a very bad horse. At other times when scuffling, I do not take much notice if I destroy a few plants, but this time when the horse treads on one of my stalks I feel almost as bad as if he trod on me. However, the soil falls apart splendidly and I am having no trouble in killing the weeds. 20th January: Scuffling finished and the result is a very satisfactory job, in my opinion. Plants are now about 2 ft. high and growing exceptionally quickly. 27th January: Still growing, but beginning to look very bad during the heat of the day. My visions of the first prize are also becoming very dim. The worst part of it is that nothing can be done to improve matters, as there is not a weed to be seen anywhere and the soil is nice and loose. 4th February: In walking over the plot to-day, I noticed that the Early Leeming maize appears to be bad for suckers, as my

plot is thick with them, while 90-Day maize near at hand is entirely free. Otherwise the two varieties appear much the same so far. 8th February: First tassels noticed to-day, and the weather is horribly dry. In spite of this, corn is about 5 ft. high, but very withered. Pulled all the suckers from plot to-day to allow the main stalks all the moisture possible. 4 p.m.: Hopes reviving, as storm clouds appear in the west. A good downpour now will make a vast difference. 9th February: The first prize again appears before me. Smart storm yesterday evening, and good steady rain all to-day; in all about 3½ in. fell. This will do a world of good. 20th February: Several more light showers to-day. Corn is beginning to show cobs, but these light showers don't last long. We want another good soaking rain to produce proper growth. There appears no chance of this, however. 28th February: Getting very downhearted again. Dry, dry, dry—everything is dry—myself included. Corn withering again. 2nd March: Calamity altogether. Dreadfully hot day with scorching south-westerly winds and dust storms. Another day like this and I am ruined, or, rather, my chances of the prize are.

Weather Conditions during Early Growth—The weather conditions during early growth have been absolutely bad, no rain having fallen since plants were a fortnight old. They are now six weeks old, and are having extremely hot, dry weather, which causes the leaves to curl up completely during the heat of the day.

Date of First Appearance of Tasselling—First tassels noticed Monday, 8th February, 1915.

Weather Conditions during Tasselling and afterwards when Cobs are Forming—Just as the first tassels appeared—*i.e.*, on the 8th—we had good rain; but then it was dry and hot again, so that the cobs did not make proper growth. Rain fell again on the 5th March, however, which improved things considerably.

Was Plot Watered other than by Rain?—No; plot depended entirely on rain for moisture.

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## WOMEN IN AGRICULTURE.

The enrolment of a female student at the Dookie Agricultural College, with the report of the principal, Mr. Hugh Pye, to his council in regard to the innovation, raises an interesting and important question. A change is indicated in the relationship of women to agriculture, and, like every other change, it will be looked upon with both approval and condemnation by different observers. The development of modern conditions of life has greatly widened and changed the sphere of women's industrial and business activity, and, whether we approve of the change or not, it is important for us to recognise it and observe the direction of its tendency. When agriculture is compared with the other industries into which women are entering with increasing energy, little can be discerned in it that is calculated to preserve it as an exclusive sphere for men's occupation. As a matter of fact, there are many aspects of it

specially suitable for women, and there is nothing surprising in the fact that it should be invaded by the forces of the modern movement. In reality the invasion has been proceeding for a considerable time, and has already assumed considerable dimensions. Not much can be done to stop movements of this kind, even when it is desirable to do so. In this case there is little evidence that a larger participation in the agricultural industries would not be to the advantage of agriculture as well as of the general condition of society.

To understand what is new in this modern innovation it is necessary to remember that agriculture or farming consists of many widely varying branches. It not only embraces numerous differing branches connected with the cultivation of various crops and the keeping of different classes of live stock, but, like other industries, it must be considered in two aspects—viz., in regard to the work or labour involved, and in regard to the skill or knowledge employed in its management or direction. There are "farmers" and "farm labourers," and it is well to observe which of these two classes is meant when women are spoken of as engaging in agricultural occupations. Are they becoming occupiers and managers of farms, orchards, and vineyards, or are they serving as labourers on such places? There is surely nothing new in women engaging in farm work. They have in the past always taken an important part in the work of the field, of the farmyard, of the byre, and the dairy, as well as the orchard and the vineyard. As a matter of fact, modern progress has been in the direction of decreasing the proportion of female labour in agriculture, and in new countries like Australia, Canada, and the United States the almost entire absence of women from the fields is a marked feature of their newness. The new movement, therefore, cannot be a proposal for women to undertake farm labour. There are departments of farm work which are in their nature unsuitable for women. These have rarely been allotted to female labourers, and the new movement surely does not propose a backward step in this direction. This brings us back to the Dookie student, who has given rise to the discussion, "What is she doing?" She is certainly not preparing to be a farm labourer. It is not necessary to study the rudiments of the sciences upon which agriculture is founded in order to be a farm labourer. She is manifestly learning to be a "farmer"—to manage farm property and direct labour. If with the male students she works on the farm, it is not because she expects to have to do all branches of farm work herself when she becomes a farmer, but because, like the male students, she may know how to direct farm labourers. It is in aiming at being a "farmer," an "agriculturist," that this student is doing anything out of the common, and here we have the real nature of the innovation. What claims have women to be considered fit for assuming the position of farmers or managers of agricultural enterprises?

If we look at agriculture in its normal condition, as it has been conducted in the long past, and not in its changing modern phases, the part taken by women is found to have been by no means an unimportant one. The farmer has been assisted in his industry by his wife and his

daughters as well as by his sons. It has to be remembered that a farm is a home as well as an establishment for providing the means of living, and the home has always been an important department. Neither have modern developments decreased the essential value of the home department. There has certainly been evolved in the pioneering stages of agriculture in the new countries of America and Australia a crude type of producing centres, where wheat or live stock are raised under a rough and temporary system of exploitation. These, however, are not "farms," and the systems adopted are not farming. They are "camps," "ranches," or "stations," and they have to be followed in the course of progress by farms on which the homes must take their essential position of importance. When the relation of the home to the prosperity of farming is considered, it is realised that women have always been vitally associated with agriculture, and it is further manifest that farming, more than any other industry, is dependent upon woman's work and her special services. Modern changes have seen women invading many spheres in which the duties could be performed at least as well by men, but the case is different in relation to agriculture. A withdrawal of the part which woman has hitherto taken in farming would evidently be fatal to the industry, however well she could be spared from other spheres of business or occupation. It may, therefore, be in the interest of farming if women are now seeking to assume a larger share in the conduct of the industry.

But, before considering woman's fitness for a wider sphere of agricultural duties, it may be well to reflect upon the effect which is being produced upon the industry by other features of modern developments. Those tendencies which have produced the great cities and towns of the industrial age have, in all progressive countries, brought about a serious depletion of rural population. "Back to the land" is a cry which, for more than a generation, has voiced the suffering of agriculture by the loss of its producing population. Statesmen are agreed that one of the greatest needs for the accomplishment of permanent prosperity is an increase of primary production. This need is recognised in this country as clearly as in other parts of the world. While opinions differ as to the means by which primary production can be increased, no one disputes the vital importance of the object itself. In studying the causes and the remedies of rural depopulation, attention is too much confined to industrial or financial factors, and insufficient weight is attached to social influences. The effect upon this problem of the attitude which women have assumed towards agriculture and rural life has been more potent than has been recognised. What are the views of city girls in regard to marrying a farmer? The question is easily answered. It is not his income that is objected to, but the life such a marriage involves. If the city girl were willing to become a farmer's wife, what kind of a wife would she make? That question is also easily answered. It is evident that the young farmer would do well to marry his neighbour's daughter. But where is the neighbour's daughter? Perhaps whenever she left school she emigrated to the city. She, in fact, is probably one of those

city girls who decline to marry a farmer. As we have seen that the home is an essential part of the farm, with what difficulty farming and primary production are to be promoted until some important social changes are brought about. It may be that the movement suggested by the Dookie student under notice is the beginning of those necessary social changes.

If we inquire how far the part played by woman in agriculture hitherto suggests fitness for the leading rôle now being assumed, there is much to encourage expectation. Farmers' wives, as managers of the important home department, have been called upon to exercise many of those functions which have to be applied to the other branches of the farm—foresight, economy, industry, patience, skill, judgment in buying and selling. Have not farmers' wives displayed, as a rule, these qualities in the management of the house, the dairy, and the poultry yard as successfully as the farmer has done in the department under his direction? It may even be claimed that the farmer would have been more successful if his operations had been to a greater extent governed by the principles of "domestic economy." It has often happened that the head of a farming family has been prematurely removed, and the mother has had to assume the management in his place; but how seldom has she failed? It is difficult, indeed, to point out any feminine quality which is a disqualification for the management and direction of agricultural industries. Certainly there are departments of farm labour which are not suitable for women, but there are also departments of farming quite unsuitable for men—viz., those undertaken by farmers' wives. It is the directorship that women now proposes to assume, and it is difficult to deny her qualifications. It is likely, therefore, that women students at agricultural colleges will increase, and not improbable that the agricultural college in England for training girls will have its imitators. One result may be the elevation of agriculture and rural life in the estimation of young women, and than this nothing could do more to check the drift of agricultural population to the cities and bring about the necessary increase in primary production.—"Australian Farm and Home."

## THE QUEENSLAND COTTON CROP OF 1914-15.

In connection with the cotton crop for this year, it is the intention of the Minister of Agriculture to take in hand the treatment of the crop in the same manner as was done last year, that is to say, that the Department will advance 1¾d. per lb. on the raw cotton, and afterwards sell the cotton and seed and distribute the profits amongst the suppliers. The Department will not make any charge for the work, but will deduct

any expense incurred in obtaining additional labour. Last season there was a small crop (9,445 lb. of seed cotton) which, when treated at the ginning house established at the Department of Agriculture, resulted in a yield of ginned cotton which, after all expenses were paid, enabled the Department to distribute an additional return over and above the 1½d. per lb. advanced to suppliers. It would be well if farmers would realise that cotton is a drought-resisting plant, that it requires little cultivation after it has made a good stand; that, beyond the boll worm, which can be overcome by alternative rows of cotton with a few rows of maize (which the insect prefers to cotton bolls), no disease troubles it. Had there been large areas of cotton planted in the districts which have, in the first half of the year, suffered so severely from drought, the growers would have realised very fair profits, the American quotations for ginned cotton being now 7d. per lb. and likely to go higher. When the present war is over, and many more settlers come to this State, we shall probably see cotton-growing established on a firm basis.

At the time of the Civil War in the United States of America, when American cotton could not be obtained except through successful blockade runners, Queensland had a splendid opportunity, and cotton was largely grown for several years, the farmers receiving 3d. per lb. for good seed cotton. Now 1,000 lb. of seed cotton (Uplands) is an ordinary return per acre, and as much as 1,500 and 2,000 lb. have been picked per acre in Queensland. How does a crop of 1,000 lb. of cotton compare with a 40-bushel crop of maize? In normal seasons, when good crops of maize are harvested, the average price per bushel may be put at 3s. 6d. to 4s., which is £8 per acre. The 1,000 lb. of cotton at 2d. per lb. amounts to £8 6s. 8d. per acre. But the cost of harvesting the crops has to be taken into consideration, when we come to reckon the profit. Maize has to be pulled, husked, threshed, winnowed, and bagged. Cotton has to be picked, sunned for a few hours, and bagged. In both cases white labour is employed. Cotton-growing in this State is a white man's job. If he has a family, he need employ no outside labour to pick it, which means ½d. per lb. saved to the farmer. Furthermore, in these days, the seed has a great value, which it had not in the sixties and seventies in Queensland. The seed which was then thrown out as useless, now brings from £4 to £6 per ton for oil and cake purposes. The 600 lb. of seed contained in a 1,000-lb. crop is worth from £1 to £1 10s. We have written so much about cotton-growing and its possibilities and certainties, that at the moment of writing we are wondering that many dairy farmers, who are to-day threatening to dry off their cows and give up dairying for the purpose of supplying the wants of cities, do not devote a few acres to a crop which will leave them a profit instead of what their present business shows, as they tell us, a dead loss. It is not

known how much will be sent in this season. It is believed that if the industry weathers the next year or two it may become more firmly established in Queensland, but, as is well known, the difficulty is the cost of labour for picking. A machine is now being tested which it is hoped will overcome this trouble. It is designed on the vacuum principle. The area planted last year was 134 acres, the yield being 20,336 lb. of seed cotton.

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## CHANGES IN THE DEPARTMENT OF AGRICULTURE AND STOCK.

Mr. H. C. Quodling to be Director of Agrictulture. Connected with Mr. Quodling will be the Instructors in Agriculture, Messrs. G. B. Brooks and A. E. Gibson; the Field Assistants, Messrs. E. R. Ashburn and H. Bechtel; also the travelling exhibit, which has been sent round to the various shows by the Department; and the State Farms at Hermitage, Bungeworgorai, Warren, Gindie, and Kairi.

Mr. A. H. Cory, M.R.C.V.S., has been appointed Chief Inspector of Stock, and will attend to stock and slaughtering matters in that portion of the State south of Mackay and of the 22nd parallel. He will also exercise veterinary supervision over the Stock Experiment Station at Yeerongpilly.

Mr. G. Tucker, M.R.C.V.S., will be Northern Deputy Chief Inspector of Stock, and will act as Director of the Stock Experiment Station at Townsville, besides attending to stock and slaughtering matters throughout the districts north of the 22nd parallel.

Mr. A. H. Benson, who has been appointed Director of Fruit Culture, took up his duties at the beginning of September. He will attend to all matters affecting the fruit industry, including the administration of the Diseases in Plants Act and the Fruit Cases Act. He will also exercise supervision over the State Nursery at Kamerunga, Cairns.

Mr. Cuthbert Potts, B.A., has been appointed Principal of the Queensland Agricultural College, Gatton, and took up his duties there at the end of September. Mr. Potts comes from the Hawkesbury Agricultural College.

Mr. R. P. M. Short has been appointed Registrar of Brands, while Mr. A. T. Jefferis, B.Sc., has been appointed Science and House Master at the Agricultural College, in succession to Mr. Ellard. Mr. Jefferis was formerly in the Department's Chemical Laboratory. Mr. A. R. Wilkin has been appointed Instructor in Cheesemaking, and his position as a Cream Inspector has been filled by Mr. W. S. Hartley, formerly Dairy Inspector at Nanango.

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

Milking Records of Cows for Month of August, 1915.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Lennie ... | Ayrshire ... ... | 23 July, 1915 | 1,000 | 3·8 | 44·57 | |
| Iron Plate ... | Jersey ... ... | 2 Feb. ,, | 539 | 5·5 | 35·05 | |
| Lady Twylish | ,, ... ... | 5 June ,, | 531 | 5·0 | 31·33 | |
| Noble Dot ... | ,, ... ... | 2 May ,, | 532 | 4·8 | 30·12 | |
| Bluebelle ... | ,, ... ... | 20 June ,, | 628 | 3·9 | 28·73 | |
| Netherton Belle | Ayrshire ... ... | 23 April ,, | 549 | 4·3 | 27·82 | |
| Miss Bell ... | Jersey ... ... | 2 July ,, | 529 | 4·4 | 27·39 | |
| Lark ... | Ayrshire ... ... | 17 June ,, | 559 | 4·0 | 26·25 | |
| Gretchen ... | Holstein ... ... | 15 Aug. ,, | 598 | 3·4 | 23·75 | |
| Lady May ... | Ayrshire ... ... | 7 Mar. ,, | 518 | 3·8 | 23·07 | |
| Black Bess ... | Jersey ... ... | 4 June ,, | 451 | 4·3 | 22·82 | |
| Lady Athol | Shorthorn... ... | 27 May ,, | 506 | 3·7 | 21·94 | |
| Thornton's Fairetta | Jersey ... ... | 27 Mar. ,, | 351 | 5·0 | 20·71 | |
| Lady Lil ... | ,, ... ... | 27 June ,, | 366 | 4·4 | 19·37 | |
| Rosine ... | Ayrshire ... ... | 7 Aug. ,, | 435 | 3·8 | 19·37 | |
| Cocoatina ... | Jersey ... ... | 6 Mar. ,, | 316 | 5·0 | 18·64 | |
| Princess Kate | Ayrshire ... ... | 9 July ,, | 463 | 3·4 | 18·43 | |
| Lady Melba | Holstein ... ... | 6 Mar., 1914 | 399 | 3·9 | 18·25 | |

Grazed on natural pastures, supplemented by a ration of 30 lb. of maize ensilage daily.

## GOAT'S MILK FOR TICKS.

Mr. J. F. Keane, Carbeen, writes:—Your article on milch goats in the June issue of the Journal tells me much I did not know, and encourages the idea that we may be on the brink of a very big thing. I have lately met farmers who have raised calves on goats' milk, and all are quite positive that the calves had no ticks on them while receiving the milk. To quote the words of one of them: "I thought everybody knew that, but it is really no good, since they get ticky again as soon as they are turned out." To my mind, the matter is set at rest. It is the goat's milk that kills the tick. Now, if the active principle, whatever it may be, that protects the goat, can slay a comparative monster like a cattle tick in the attenuated form in which it must reach it through the mamma of the goat and the digestion of the calf, what chance would a little thing like a tubercle baccillus stand if it met the full strength of it? If the histologist and bacteriologist ever isolate the goat's "good fairy," something makes me think it will turn out to be an inherent corpuscle rather than a virus.

## TO PREVENT MILK FROM CREAMING.

The natural tendency for the minute fat globules is to rise to the surface of the milk, and this will happen to a greater or less degree irrespective as to whether the creams are stirred up by a rotary or semi-rotary movement of the stirring apparatus. The most effectual method of keeping the fat globules intermingled with the milk in anything approximating even proportion is to be attained by stirring the milk by means of a plunger. The adoption of this method is effectual in carrying the fat globules down amongst the lower milk strata.

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## * NOTES ON THE NEED FOR AND THE VALUE OF ENSILAGE.

The silage method of preserving crops for future need does not take hold with the force that its undoubted merits would justify, and, despite the activity of Officers of the Department of Agriculture in their efforts to popularise the silo as a means for the conserving of fodder in a form highly suitable for sustaining the dairy herd, little addition has yet been made in the quantities of silage prepared from year to year, and the amount of ensilage annually prepared has never reached 5,000 tons —a poor record, indeed, for a State concerned in providing sustenance for 365,000 milch cows.

It is during a season like the past, when the failure of both grass and fodder crops occurred in many districts, that the true value of silage is to be readily recognised. By enabling the surplus crops of a favourable season to be held over in a succulent condition for use during a subsequent "dry spell," the silo provides the safest form of insurance against the depredations of a drought, and renders the farmer practically independent of the influences of adverse weather conditions.

The silo is a necessary adjunct to the dairy farm, and the value of ensilage as a fodder is fully appreciated by dairying communities the world over, except, possibly, in Queensland, where neither the silo nor any substituted method of conserving fodder seems to gain the favour of the dairy farmer.

It is only necessary to instance the disturbing influence exerted by the recent dry spell upon the volume of the production of dairy products, in order to gain an insight into the amount of wealth lost to the dairying community on account of improvidence and non-acceptance of the silo as an approved method of fodder conservation. The dairy farmers operating without a supply of fodder in reserve were forced to purchase food for their stock in the open market at a rate which prohibited the production of milk at a reasonable cost; and, instead of the dairymen being in a position to take advantage of the relatively high prices maintaining for dairy produce throughout Australia at the time, they were actually conducting their dairies at a loss.

Cases of dairy farmers being compelled to temporarily relinquish dairying, and place their dairy herds upon agistment in more favoured localities, were of common occurrence.

* Contributed by the Director of Agriculture and Mr. G. Graham (Dairy Expert).

An adequate supply of ensilage upon the farms would have eliminated or, at least, materially reduced the distress directly occasioned by the scantiness of the rainfall. Our methods of farm husbandry must remain incomplete until such time as silage is afforded greater attention by stockowners.

Ensilage exerts a decided tendency towards equalising the summer and winter production of dairy produce, for by its use silage assists in keeping the milk yields even and permanent throughout the year.

Ensilage is an attribute to success in dairy enterprise, and a bountiful supply of this fodder contributes largely to the profits derivable from the well-managed dairy farm.

The Stock-raisers resident within the closely settled areas can ill afford to be without the silo and its attendant advantages, particularly as a ration of ensilage is relished alike by oxen, sheep, and swine. These animals thrive when fed upon the succulent silage, which is equally efficacious for the purpose of producing flesh or milk when used in conjunction with a food rich in protein such as lucerne or cowpea.

It must be recognised at this period, when high prices for building material prevail and when people are anxious to husband their resources, that the time would be inopportune to advocate an outlay for silo and plant; consequently, immediate expansion in the way of conserving fodder must be on inexpensive lines, and in this connection the method of putting up green fodder in an approved manner in the form of a silage stack should readily appeal to all dairymen and stock-owners within closely settled areas.

For reasons stated, it is the aim of the Department of Agriculture and Stock to encourage fodder conservation throughout all Dairy districts.

The results accruing from previous work carried out under the direction of Officers of this Department have demonstrated the efficacy and practicability of the methods advocated.

This year it is purposed to send Officers out to give demonstrations in approved methods of silage-stack construction at a number of different dairying communities. These Officers will work in conjunction with the respective Dairy Inspectors, who are now making inquiries and organising with a view to the initiation of a widespread scheme of fodder conservation. The primary effort is to secure two farmers in each district willing to grow crops for the purpose of providing supplies of green maize to be used in connection with the demonstrations previously referred to. Naturally, it is anticipated that a considerable number of farmers in each locality will also plant up areas with fodder crops and actively engage in their preservation in a similar manner.

It is considered that a decided impetus would be given to the movement by various Farmers' Progress Associations encouraging discussion on this subject amongst their respective members. In this way it is possible that publicity may be given to the whole project, and the need of the Silo and the economic part it should play in farm husbandry thereby brought home to those immediately concerned.

## TO ESTIMATE THE AMOUNT OF COMMERCIAL BUTTER CONTAINED IN MILK OF VARYING BUTTER-FAT TEST.

In connection with this matter the following noting has been made by Mr. E. Graham, Dairy Expert:—

"Usually the amount of commercial butter to be won from milk of a given test is to be most readily and accurately estimated by reference to a chart. In this State, O'Callaghan's Chart is in general use, and the chart is procurable from most booksellers of note. In the absence of the chart for determining the commercial butter content of a known quantity of milk of a given test, it is possible that the most accurate formula to be adopted for this purpose is as follows:—

First deduct ·22 from the butter-fat test; then multiply the remainder by the number of pounds of milk; next divide the product by 85. The quotient represents the estimated yield of commercial butter.

*Example.*—Find the commercial butter-fat content of 85 lb. of milk testing 3·8 per cent. of butter-fat—

$$3{\cdot}8 - {\cdot}22 = 3{\cdot}58 = \frac{358}{100}$$

We then have—

$$\frac{358}{100} \times \frac{85}{85} = \frac{358}{100} = 3{\cdot}58 \text{ lb. of commercial butter.}"$$

## MAINTENANCE OF YOUNG PIGS.

In laying down plans to maintain 100 pigs and carry them on to a fattening stage, either the initial work entailed in the rearing of the animals has been overcome, or else some natural supplementary food from the dairy farm or factory is available.

A supply of milk or by-products plays such an important part in the management and early life of young pigs that the change to their maintenance on "grazing" or "soiling" crops should preferably be a gradual one, and for obvious reasons the chief crops should be rich in flesh-forming constituents.

Lucerne is practically the main stand-by for pig-raising on this account. At certain periods of the year mature crops of cowpeas are invaluable also for the same purpose, and for fattening.

Apart from the consideration or the element of danger in using immature plants of the Sorghum family as food for animals, the crops mentioned by Mr. Evans—viz., Sorghum, Kafir Corn, Panicum, and Millets—if grazed as early as intended, will not supply the character of

food necessary for maintaining growing pigs, nor will these fodders be altogether satisfactory for assimilation in large quantities. From the investigations of the Agricultural Chemist it would appear that there is always danger in using plants of the Sorghum family when immature, and for this reason other crops are to be preferred if such a choice can be made. The seed heads of Kafir Corn and Sorghum make excellent food to supplement other classes of farm crops, and play an important part also in pig maintenance and for fattening.

Without a fuller knowledge of the conditions under which it is purposed to keep these pigs, generalities can only be touched upon—that is to say, the names of the most suitable crops for pig-feeding can be given, and the sowing of these crops to maintain a continuity of feed depends a great deal on the judgment of the person who is in charge of the animals and the conveniences at hand. A supply of green food in the way of Lucerne can only be kept up throughout the greater part of the year by means of irrigation. Other crops which can be grown under field conditions may be set down as follows:—Rape and Barley for sowing in March and April. Field Peas of various kinds in May and June. Maize, Kafir Corn, Sorghums, and Cowpeas in Spring and Summer. Cabbages, Swede and other turnips for planting in late February, March, and April; Mangels in April and August. Sweet Potatoes, Jerusalem Artichokes, Pumpkins, and Melons in Spring.

## LICE ON PIGS.

To get rid of this trouble, cleanse the skin thoroughly with soap and water, and then rub in a decoction of Stavesacre—1 part to 40 parts water.

## FEEDING MOLASSES TO SHEEP WITHOUT CHAFF.

In reply to a correspondent on this subject, Mr. W. G. Brown, Instructor in Sheep and Wool, advises as follows:—

"Without roughage such as chaff, or old grass, molasses would not be a valuable feed for stock. A sheep drinking molasses would allow the liquid to pass directly into the 3rd or 4th stomach and right through the system. It is doubtful if sheep or any other animals which chew the cud would get much benefit from molasses. It would act as a purgative.

"The usual proportions of molasses to water used in mixing with rough feed of any kind is half water, half molasses, with about 2 oz. of salt to the gallon of mixture; this is mixed up with the chaff. In my opinion a method of feeding to keep sheep alive, which was used at Thurulgoona in 1902, would be quite as good, and very little dearer.

"About 4 oz. of maize per head per day, thrown on the ground in the form of a circle 50 yards in diameter, will keep sheep alive easily, and will cost one-third of one penny per day with corn at 6s. per bushel. I know this saved the lives of 30,000 sheep fifteen years ago.

"Molasses is good with roughage. In pure liquid form, not nearly so good."

## THE LATE P. R. GORDON.

Amongst the many old colonists who have lately passed away, and whose loss must be considered as almost a national one, is P. R. Gordon, who for many years held the position of Chief Inspector of Stock in the Department of Agriculture and Stock. In his youth he received his first training in the office of a solicitor or writer to the signet, in Aberdeen, and afterwards took great interest in matters dealing with stock of all kinds, which training was to stand him in good stead when, later on, he left the old country and settled in Victoria, where he became a station owner and manager. Subsequently he went to New South Wales, and was appointed metropolitan inspector of stock under the late Alexander Bruce. He assisted Mr. Bruce in stamping out the scab disease in sheep in New South Wales. In 1867 Mr. Gordon came to Brisbane, where he received the appointment of Chief Inspector of Stock. In that year, he assisted to draft the Diseases in Sheep Act of 1867, and subsequent amendments. He was also the originator of the Brands Act of 1872, and, having had experience of the working of the Brands Act in New South Wales, he framed the Queensland '72 Act, which is, without doubt, the best system in Australasia, if not in the world. In Mr. Gordon's early days, there were no Parliamentary Draftsmen, and therefore, the framing of the Stock Acts, &c., devolved greatly on him, and his earlier experience in a lawyer's office greatly aided him in this, and similar work. He was, in conjunction with the late John Fenwick and Gresley Lukin, the originator of the present thriving institution, the Queensland National Agricultural and Industrial Association. Versatile in his accomplishments, he was one of the founders and chief supporters of the Brisbane Musical Union. He played several instruments, amongst them the drum tympani, and if the drums went astray, he took a score and sang in the chorus. In all expositions, such as the Indian and Colonial and others to which Queensland exhibits were sent, he was a leading factor in advancing the State's interests. He and Mr. Bruce were originators of the Annual Conference of Chief Inspectors of Stock of Australasia, conferences which were held alternately in the different States, with a view to establishing uniformity in all matters connected with the movements, diseases, &c., of stock. Mr. Gordon was always an advocate of a Stock Institute on the lines of the Pasteur Institute, to which all matters connected with stock should be submitted. In this, however, he was not supported by the other States, but he succeeded in founding the original Stock Institution, which was located in a temporary building in Turbot street, Brisbane, of which Mr. J. C. Pound (now Director of the Yeerongpilly Institute) was appointed director.

Those who were intimate with him will remember him as a good raconteur, reciter, and comic singer, his favourite comic song being "The Lively Flea." Mr. Gordon was always a strong advocate for introducing new blood into the flocks and herds, horses, and swine in the State. He compiled, and issued at one time, "The Drovers' Guide," which embodied the best parts of the various Acts he assisted in framing.

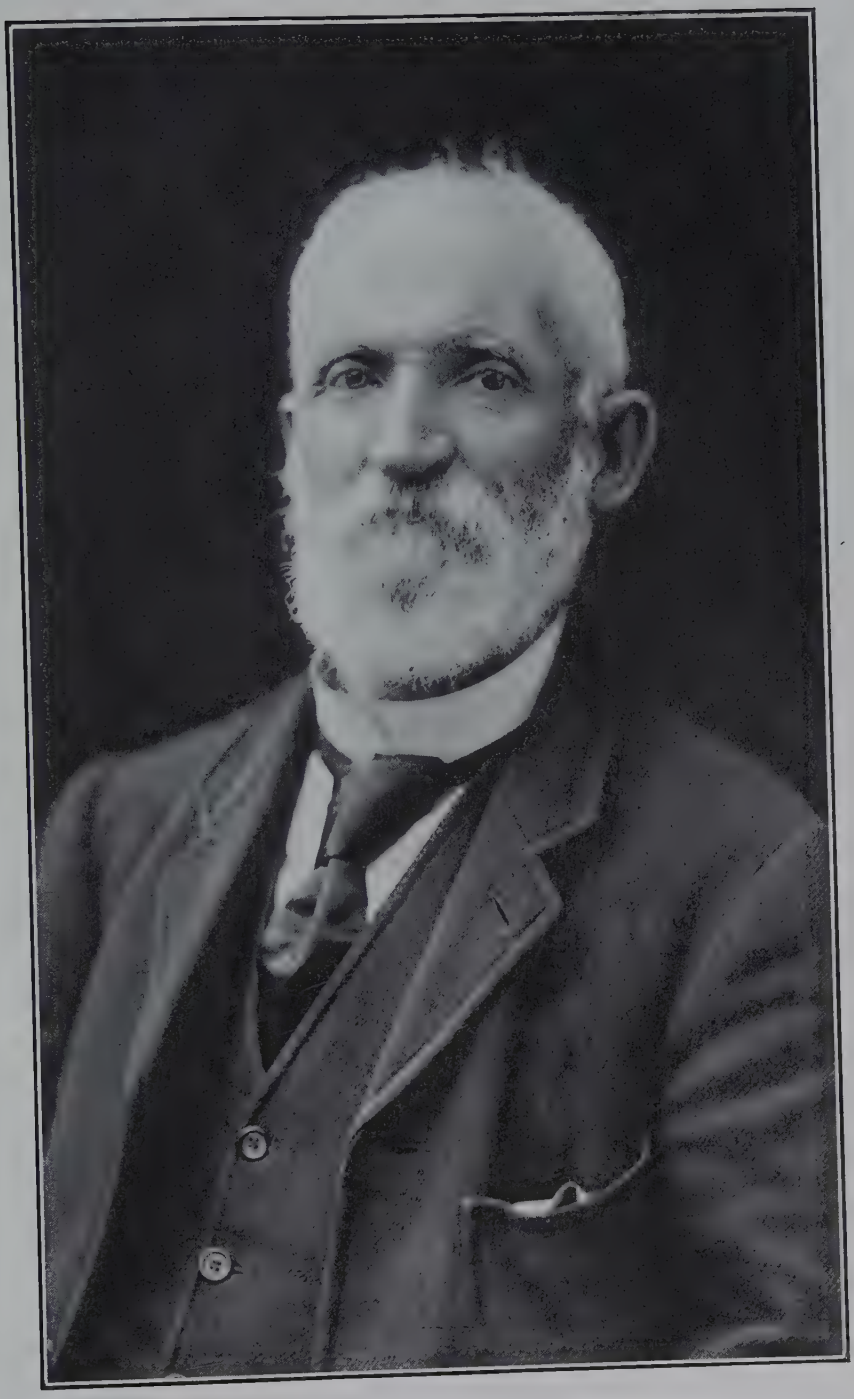

Plate 16.—The late P. R. Gordon, Chief Inspector of Stock for Queensland from 1868 to 1904.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JULY, 1915.

Six thousand five hundred and sixty-three eggs were laid during the month, an average of 123·8 per pen. Most of the birds have now settled down to work and are doing well. E. A. Smith's Black Orpingtons win the wonthly prize with the splendid total of 150 eggs. The following are the individual records:—

| Competitors. | Breed. | July. | Total. |
|---|---|---|---|
| Jas. McKay | White Leghorns | 144 | 507 |
| Mrs. J. Jobling, N.S.W. | Black Orpingtons | 135 | 505 |
| Mrs. Munro | White Leghorns | 131 | 454 |
| J. Gosley | Do. | 146 | 454 |
| J. D. Nicholson, N.S.W. | Do. | 117 | 435 |
| A. W. Bailey | Do. | 133 | 429 |
| C. E. Bertelsmeier, S.A. | Do. | 118 | 428 |
| S. E. Sharpe | Do. | 131 | 426 |
| J. R. Wilson | Do. | 130 | 423 |
| J. M. Manson | Black Orpingtons | 144 | 416 |
| King and Watson, N.S.W. | White Leghorns | 129 | 416 |
| Kelvin Poultry Farm | Do. | 136 | 416 |
| E. F. Dennis | Do. | 126 | 403 |
| A. H. Padman, S.A. | Do. | 107 | 402 |
| C. F. Clark | Do. | 124 | 400 |
| A. T. Coomber | Do. | 113 | 386 |
| T. Fanning | Do. | 116 | 384 |
| E. Le Breton | Do. | 141 | 383 |
| E. V. Bennett, S.A. | Do. | 117 | 381 |
| H. Harmill, N.S.W. | Do. | 126 | 379 |
| R. Jobling, N.S.W. | Do. | 128 | 376 |
| R. Jobling, N.S.W. | S. L. Wyandottes | 111 | 371 |
| J. M. Manson | White Leghorns | 120 | 368 |
| O.K Poultry Yards | Do. | 116 | 368 |
| T. Fanning | Black Orpingtons | 140 | 367 |
| C. Knoblauch | White Leghorns | 108 | 366 |
| F. Clayton, N.S.W. | Do. | 122 | 361 |
| Geo. Tomlinson | Do. | 128 | 358 |
| R. Burns | Black Orpingtons | 126 | 357 |
| W. Meneely | Do. | 128 | 357 |
| Cowan Bros., N.S.W. | White Leghorns | 117 | 354 |
| W. Purvis, S.A. | Do. | 136 | 347 |
| E. A. Smith | Do. | 132 | 346 |
| Derrylin Poultry Farm | Do. | 132 | 343 |
| W. Parker | Do. | 132 | 343 |
| Moritz Bros., S.A. | Do. | 123 | 340 |
| R. Burns | S. L. Wyandottes | 132 | 336 |
| Cowan Bros., N.S.W. | Black Orpingtons | 139 | 333 |
| W. Lyell | White Leghorns | 111 | 330 |
| J. Aitchison | Do. | 96 | 327 |
| W. Lindus, N.S.W. | Do. | 140 | 314 |
| G. H. Turner | Do. | 122 | 308 |
| J. Zahl | Do. (No. 2) | 110 | 308 |
| J. Zahl | Do. (No. 1) | 136 | 302 |

| Competitors. | Breed. | July. | Total. |
|---|---|---|---|
| J. G. Richter ... ... ... ... | White Leghorns ... | 128 | 288 |
| E. A. Smith ... ... ... ... | Black Orpingtons ... | 150 | 282 |
| Loloma Poultry Farm, N.S.W. ... | Rhode Island Reds ... | 107 | 260 |
| J. G. Gill ... ... ... ... ... | White Leghorns ... | 116 | 260 |
| E. Pocock ... ... ... ... ... | Do. ... ... | 100 | 247 |
| S. Chapman ... ... ... ... | Brown Leghorns ... | 101 | 211 |
| F. Clayton, N.S.W. ... ... ... | Rhode Island Reds ... | 124 | 187 |
| W. H. Forsyth, N.S.W. ... ... | White Leghorns ... | 103 | 168 |
| J. R. Johnson ... ... ... ... | Plymouth Rocks... ... | 85 | 85 |
| Totals ... ... ... ... | ... | 6,563 | 18,695 |

[The above report was inadvertently omitted from the September issue of the Journal—Ed.]

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, AUGUST, 1915.

Seven thousand one hundred and seventy-six eggs were laid during the month, an average of over 135 per pen. T. Fanning's Black Orpingtons win the monthly prize with 154 eggs. The following are the individual records:—

| Competitors. | Breed. | August. | Total. |
|---|---|---|---|
| Jas. McKay ... ... ... ... | White Leghorns ... | 139 | 646 |
| Mrs. J. Jobling, N.S.W. ... ... | Black Orpingtons ... | 135 | 640 |
| Mrs. Munro ... ... ... .. | White Leghorns ... | 140 | 594 |
| J. Gosley ... ... ... ... ... | Do. ... ... | 140 | 594 |
| C. E. Bertelsmeier, S.A.... ... ... | Do. ... ... | 147 | 575 |
| J. D. Nicholson, N.S.W. ... ... | Do. ... ... | 138 | 573 |
| S. E. Sharpe ... ... ... ... | Do. ... ... | 141 | 567 |
| A. H. Bailey ... ... ... ... | Do. ... ... | 138 | 567 |
| J. M. Manson .. ... ... ... | Black Orpingtons .. | 149 | 565 |
| J. R. Wilson ... ... ... ... | White Leghorns ... | 142 | 565 |
| Kelvin Poultry Farm ... ... ... | Do. ... ... | 143 | 559 |
| King and Watson, N.S.W. ... ... | Do. ... ... | 134 | 550 |
| E. F. Dennis ... ... ... ... | Do. ... ... | 140 | 543 |
| A. H. Padman, S.A. ... ... ... | Do. ... ... | 140 | 542 |
| C. T. Clark ... ... ... ... | Do. ... ... | 130 | 530 |
| E. Le Breton ... ... ... ... | Do. ... ... | 142 | 525 |
| H. Hammill, N.S.W. ... ... ... | Do. ... ... | 146 | 525 |
| T. Fanning ... ... ... ... | Black Orpingtons ... | 154 | 521 |
| A. T. Coomber ... ... ... ... | White Leghorns ... | 133 | 519 |
| E. V. Bennett, S.A. ... ... ... | Do. ... ... | 129 | 510 |
| J. M. Manson ... ... ... ... | Do. ... ... | 142 | 510 |
| T. Fanning ... ... ... ... | Do. ... ... | 126 | 510 |
| R. Burns ... ... ... ... ... | Black Orpingtons ... | 148 | 505 |
| O.K. Poultry Yards ... ... ... | White Leghorns ... | 135 | 503 |
| W. Meneely ... ... ... ... | Black Orpingtons ... | 145 | 502 |
| C. Knoblauch ... ... ... ... | White Leghorns ... | 133 | 499 |
| E. A. Smith ... ... ... ... | Do. ... ... | 151 | 497 |
| R. Jobling, N.S.W. ... ... ... | Do. ... ... | 120 | 496 |

| Competitors. | Breed. | August. | Total. |
|---|---|---|---|
| R. Jobling, N.S.W. ... ... ... | S. L. Wyandottes ... | 124 | 495 |
| Geo. Tomlinson ... ... ... ... | White Leghorns ... | 134 | 492 |
| F. Clayton, N.S.W. ... ... ... | Do. ... ... | 127 | 488 |
| W. Purvis, S.A. ... ... ... ... | Do. ... ... | 138 | 485 |
| Cowan Bros., N.S.W. ... ... ... | Do. ... ... | 131 | 485 |
| W. Parker... ... ... ... ... | Do. ... ... | 139 | 482 |
| R. Burns ... ... ... ... ... | S. L. Wyandottes ... | 143 | 479 |
| Cowan Bros., N.S.W. ... ... ... | Black Orpingtons ... | 144 | 477 |
| Derrylin Poultry Farm ... ... ... | White Leghorns ... | 131 | 474 |
| Moritz Bros., S.A. ... ... ... | Do. ... ... | 132 | 472 |
| W. Lyell ... ... ... ... ... | Do. ... ... | 133 | 463 |
| W. Lindus, N.S.W. ... ... ... | Do. ... ... | 143 | 457 |
| J. Aitchison ... ... ... ... | Do. ... ... | 115 | 442 |
| E. A. Smith ... ... ... ... | Black Orpingtons ... | 151 | 433 |
| G. H. Turner ... ... ... ... | White Leghorns ... | 124 | 432 |
| J. Zahl ... ... ... ... ... | Do. (No. 2) | 123 | 431 |
| J. Zahl ... ... ... ... ... | Do. (No. 1) | 125 | 427 |
| J. G. Richter ... ... ... ... | Do. ... ... | 131 | 419 |
| Loloma Poultry Farm, N.S.W. ... | Rhode Island Reds ... | 134 | 394 |
| J. H. Gill, Victoria ... ... ... | White Leghorns ... | 134 | 394 |
| E. Pocock ... ... ... ... ... | Do. ... ... | 133 | 380 |
| S. Chapman ... ... ... ... | Brown Leghorns ... | 117 | 328 |
| F. Clayton, N.S.W. ... ... ... | Rhode Island Reds ... | 134 | 321 |
| W. H. Forsyth, N.S.W. ... ... | White Leghorns ... | 125 | 293 |
| J. R. Johnston ... ... ... ... | Plymouth Rocks ... | 111 | 196 |
| Totals ... ... ... ... | ... | 7,176 | 25,871 |

## INCUBATORS.

Mr. Hindes, the Poultry Instructor at the Gatton Agricultural College, advises as follows:—

1. He uses three makes, viz.:—Stewart's Nonpareil (water), Cyphers, and Prairie State (hot-air) machines. All of these do excellent work when properly handled, and may be recommended. There are other machines which are probably equally good, but the above are those with which we have had personal experience.

2. The only advantage of the hot-water machines is that, in the event of the lamp going out, the temperature does not fall to such an extent or so quickly as in the case of the hot-air machines. Water, of course, cools far less quickly than air, the result being that the temperature of the egg chamber will be longer maintained.

3. The idea that a small incubator does not give such good results as a large one is altogether wrong. Our Poultry Expert states that the only "100-chicken" hatch he ever had was from a 60-egg Cyphers machine.

## BLACK ORPINGTONS.

According to the Rev. E. W. Sturges—probably the greatest authority in England on poultry-breeding, &c.—the Black Orpingtons are the most popular fowls in the world, owing to their strong basis of utility. They serve the dual purpose of providing large birds for the table, with flesh of first-rate quality; and they are good layers of large brown eggs. They are a docile breed, easily kept within bounds; and the hens make gentle mothers. The chickens are hardy, and easily reared. Mr. Sturges remarks that it is worthy of note that in the Australian laying competitions, which extend over a period of twelve months, the Black Orpington has more than once headed the list with an average of 250 eggs to its credit. In the April (1915) Competition at the Queensland Agricultural College, Mrs. Jobling's Black Orpingtons won the monthly prize with 123 eggs. In August, 1914, T. Fanning's Black Orpingtons laid 165 eggs, which won the top score; and up to June, 1915, in the 12th egg-laying competition at the College, which began on the 1st of April, Mrs. Jobling's birds topped the list with 370 eggs for the three months, Mr. J. McKay's White Leghorns coming next with 363 eggs.

## UTILISATION OF PIE MELONS.

A lady correspondent at Goodna writes, on the subject of the value of pie melons, as follows:—

"I have found, in endeavouring to sell pie melons, that people have the idea that they can only make jam of them, and consequently do not buy, because they are too busy to use them in this way. The result was that I had a large number left on my hands; but I have not regretted it, for, although a 'new chum,' I thereby discovered various ways of cooking them.

"(1) *Jam:*—Cut up into dice, and sprinkle with half the sugar over night, adding lemons or rosellas, and boil next day an hour and a-half; then add remainder of sugar and boil twenty minutes. The sugar should be 1 lb. to 1 lb. of fruit. Ginger may be used for flavouring if desired; oranges as well as lemons may be used.

"(2) *Pies:*—Cut up the melon, and boil in water until soft; drain off the water, add sugar and lemon-juice or rosellas. Put a pastry crust over the fruit, and bake.

"(3) *Vegetable:*—Boil in water until soft, with salt, as for marrow.

"(4) *Pickle:*—Cut up some onions and, after they have boiled in salt and water a while, add the melon cut up. With some cold vinegar make a paste of mustard, flour, and sugar (equal quantities of each); add this to boiling vinegar and stir until it thickens; pour this over the melon and onions, well drained from the water in which they have boiled."

Our correspondent adds—

"We tried the method for drying rosellas given in the Journal, and found it answered splendidly. I have just made some melon and rosella jam from fruit kept all the winter."

# State Farms.

## STATE FARM, BUNGEWORGORAI.

### MANAGER'S REPORT FOR THE MONTH ENDING 10th SEPTEMBER, 1915.

Meteorological.—The droughty conditions were somewhat alleviated during the latter part of August by a fall of rain which resulted in 120 points being recorded. This was supplemented by a further fall of 30 points on the 6th instant; and on Friday, the 10th, rain again was experienced, 7 points being registered. The resulting benefits have been practically nullified by the exceptionally strong drying westerly winds since experienced: that is, so far as growing crops are concerned. More especially does this apply to those late sown.

Winter Cereals.—The best of these will give very light yields, which is not to be wondered at, seeing that no moisture has been present in the subsoil since the removal of the last crop, and that sufficient to meet the requiremeints of this has not fallen during the usual growing period.

On light sandy soils where the percolation is rapid, probably some of the summer rains were not lost wholly by evaporation, as the crops growing on such situations are slightly better.

In the beginning of last month the indications were that a whole season's work would be lost. Fortunately, at present, the outlook is more hopeful and, given fair conditions, a little more seed than that sown will be garnered. This applies to the sections embodying the new crossbreds.

Summer Crops.—The following have been sown to date, viz.:—10½ acres Teterita, 1½ acres Red Kafir, 7 acres Teff grass.

Vineyard.—The warm weather has wrought a change here, and, with only one or two exceptions, the varieties have started into growth. Where possible to make observations, the indications are that a heavy crop will result under fair conditions.

Citrus Orchard.—Those trees not seriously injured by the dry weather are covered with blossom, which requires more rain to make it set.

Deciduous Orchards.—The trees in this section, on the whole, are rather late this season, due, no doubt, to the late advent of moisture. Trellised peaches, in most instances, give promise of fair yields.

Grasses.—The dry weather in the sections put down under "Rhodes" grass killed out a great portion of the plants; but those remaining have demonstrated their marvellous recuperative powers, having shoots at the present time over 1 ft. long (runners). It should be mentioned that this is on light sandy country.

Stock.—Sufficient vegetation has not appeared in the paddocks to exercise any benefit on the animals depastured therein, but with another fall of rain within a reasonable period, good feed would be assured.

M. E. Soutter, Manager.

# The Orchard.

## CITRUS CANKER.

The Florida Agricultural Experiment Station has published in Bulletin 124 (issued October, 1914), three papers on the new citrus disease, which are summarised as below by the "Agricultural News" of Barbados:—

### I.—HISTORY OF CITRUS CANKER: E. W. BERGER.

The realisation that a new citrus disease was present in Florida took place in July, 1913, when it was found in several blocks of grape fruit at a certain nursery. Specimens had been received from another locality a year earlier, but were supposed at that time to show merely an unusual form of citrus scab. The infections were traced partly to importations of *Citrus trifoliata* from Texas, partly to stock obtained direct from Japan. It transpired later that the disease was present in Alabama, Mississippi, and Louisiana.

An order was issued prohibiting importations of citrus plants into Florida; a fund was raised to which the Florida Growers and Shippers' Association contributed 2,000 dollars, and the Governor of Florida 1,000 dollars; and a campaign was started against the disease.

### II.—STUDIES OF CITRUS CANKER: H. E. STEVENS.

Grape fruit is most severely attacked, the infection occurring on leaves, twigs, branches, and fruits; then in order of susceptibility follow *Citrus trifoliata*, and the navel and some of the sweet orange varieties, which are affected on leaves, twigs, and fruits. Scattered infections have been found on the leaves and twigs of Satsuma, tangerine, lime, and rough lemon.

The distinguishing feature of citrus canker, as observed in the field, is the characteristic spotting produced on the fruit and foliage. As usually seen, the infection appears as small light-brown spots, from less than $\frac{1}{16}$ to $\frac{1}{4}$ inch in diameter. The spots are usually round, and may occur singly, or several may run together, forming an irregular area. This last usually occurs on fruits. The spots project above the surrounding healthy tissue, and are composed of a spongy mass of dead cells covered by a thin white or greyish membrane. The membrane finally ruptures and turns outward, forming a lacerated or ragged margin around the spot.

On the leaves, infections first appear as small, watery dots, with raised convex surface. These dots are usually of a darker green than the surrounding tissue. Sometimes, however, the surface of the spots is broken as soon as they appear. Spots may appear on either surface of the leaf, but they do not at first penetrate through the leaf tissue. They gradually increase in size, change to a light brown, and become

visible on both sides of the leaf. In the older spots one or both surfaces may be bulged or raised, and such spots are commonly surrounded by a narrow yellowish band or zone. In the more advanced stages the surface of the spots becomes white or greyish, and finally ruptures, exposing a light brown spongy central mass. Old spots soon become overgrown by saprophytic fungi, and may appear pink or black on account of these fungus growths.

On the fruits, the spots are very similar to those formed on the leaves. They project and retain a circular outline. They do not penetrate far into the rind. They may be scattered over the surface, or several may occur together forming an irregular mass. Gumming is sometimes associated with the spots formed on the fruits. Canker, apparently, does not cause a rot of the fruits directly, but opens the way for other fungi to enter and cause infected fruits to rot. The spots on young twigs are like those on the leaves and fruit. On the older twigs they are more prominent, and more or less irregular in shape. This is especially true of old spots. They show the same spongy tissue as is found in the spots on the leaves, but assume a cankerous appearance, and the surface membrane completely disappears. These spots or cankers are formed in the outer layers of the bark tissue, and do not penetrate to or kill the wood. The spots once formed in the bark are persistent, and are not readily sloughed off. They may remain for a long time, and form centres from which infections may readily spread. This is confirmed by observations on infections produced on potted trees in the greenhouse, and in the grove by artificial infection. Some of these spots have been under observation for over a year, and show no tendency to slough off.

Other citrus diseases with which canker may be confused are Scab, Scaly Bark, and possibly Anthracnose. It can, however, readily be distinguished from any of these by noting the following points:—

"1. It differs from scab in the typical round spots produced; the size of the spots, and the fact that the spots penetrate through the leaf tissue. It does not distort the leaves. There are no wart-like projections. Canker occurs on older wood, Scab does not.

"2. Canker differs from Scaly Bark in the size of the spots, which are much smaller and more circular than those of Scaly Bark; and the spongy nature of the spots—Scaly Bark spots are hard and glazed. Canker is common on grape fruit, Scaly Bark is not. Canker forms spots on leaves, Scaly Bark does not.

"3. Canker differs materially from Anthracnose in the size of the spots, which are much smaller than those of Anthracnose. Canker spots are raised, Anthracnose spots are sunken. Canker has spots of spongy character, those of Anthracnose are hard. Canker occurs on young shoots and older twigs, Anthracnose does not."

Experiments in which dry infected material was pinned to young healthy foliage showed that the disease was infectious. Small watery spots appeared in one month, and these had developed in two months into the spots typical of the disease. A fungus was isolated from the young spots, and afterwards identified among those present on the older spots. Infection experiments from pure culture gave positive results in two out of many instances.

The fruiting bodies of the fungus are small globular pycnidia, which exude the colourless spores in thread-like tendrils. The pycnidia are somewhat difficult to distinguish from the tissues of the spots.

The disease spreads with great rapidity in rainy weather, infection proceeds from the old spots even after these have passed through a winter.

## III.—ERADICATION OF CITRUS CANKER: FRANK STIRLING.

Mr. Stirling was employed by the Growers' League to try to clear up the disease first of all in Dade County, a district in which the grape fruit industry is developing very rapidly. He tells his story very dramatically.

At the outset some 200,000 nursery trees and over 500 acres of grove trees were cut back, defoliated, and the trunks painted with Bordeaux mixture or carbolineum. "At this juncture everyone began to breathe a little easier." As the inspection proceeded, more and more infection was found, and more and more was treated. The number of infected properties rose to nearly a hundred. Then with the new growth on the trees came the shock of finding that the work had been carried out in vain; that instead of checking the disease, the activity of the workers had actually contributed to its spread.

The next method adopted is even more heroic. A flaming spray produced by a machine "which resembles a plumber's blow-torch, only a hundred times larger," is used to scorch the trees, the grass, and the soil beneath, until the tree is completely charred. In one district 1,933

grove trees and 101,300 nursery trees have been burned. Some fifty men are employed on the work.

When leaving one grove for another, each man changes his suit, the discarded one being disinfected with corrosive sublimate solution. No one is permitted to touch a tree.

According to Stirling, "canker is without doubt the most infectious of any known disease." A certain 4-acre grove of grape fruit trees, inspected in the first week of June, was to all appearances free of canker. Three weeks later one tree began to show a slight infection upon one limb. Four days later canker was found on five trees; in another week the number infected was twenty-seven, and there would have been no difficulty in picking fifty boxes of diseased fruit. Canker is so deadly that a tree is rendered worthless in two or three months from the time of infection.

It will be seen that the citrus canker situation in Florida is affording us the spectacle of an attempt absolutely to eradicate a disease which has already become well established, and that in a district which must always be exposed to reinfection over the land frontier of the State. The odds against success are great, but the cost of failure would be very heavy. "It would be merely a matter of months before the canker would be entirely over the orange belt." The moral for the citrus-growing islands of the West Indies is obvious.

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## A BANANA BEARING TWO BUNCHES.

Such a *lusus naturæ* may have been observed in Queensland banana plantations, but if so we have never heard of it. The *Bulletin* of the Department of Agriculture of Jamaica (Vol. II., No. 8, August, 1915) publishes an interesting photograph (here reproduced), supplied by the General Manager of the United Fruit Company of Jamaica, Captain S. D. List, recording this very rare occurrence.

"It would be interesting," says the editor of the *Bulletin,* "to see whether the suckers from this plant are capable of reproducing this habit as a double-fruiting type of banana might prove of economic value in increasing the output of bunches from a cultivated area. The expectation is, however, that this is an accidental production and not a confirmed character of the Banana plant."

Plate 17.—Banana Plant Bearing two Bunches of Fruit.

# Tropical Industries.

## PROFITABLE MANURING OF SUGAR-CANE.

From an article in the "Fiji Planters' Journal" (August, 1915), we take the following:—

A great deal of valuable work has been done in Fiji as well as in other parts of the world during recent years with the object of improving varieties of cane plant-breeding and selection; and new varieties have been evolved or discovered which promise to yield a higher percentage of sugar than various common kinds which have been hitherto widely grown.

It is really an unbusiness-like and old-fashioned policy to grow varieties of cane which yield a large tonnage per acre, but with an actual low sugar content. In the cultivation of sugar-cane, quality stands for quite as much if not more than in other business undertakings.

It is sugar that is wanted, and it is sugar really that is only paid for, for example:—

> 30 tons of a cane containing about 14 per cent. sugar yield 3½ tons of sugar; 25 tons of cane containing about 10 per cent. sugar yield 3 tons of sugar.

And that is not all, for the 5 extra tons entail extra cost for cutting, additional haulage, and milling charges, besides depriving the soil of elements of fertility to no good purpose, necessitating an additional use of fertilisers to make up the deficiency.

Occasionally a heavy crop of a quick-growing variety of cane may yield more sugar on the whole than might be possible to get in the same time from a variety having usually a higher p.o.c.s., but "still" the expenses incurred in harvesting and milking it will be proportionally greater, and should not be overlooked in balancing up the account.

Howbeit, although a planter may make profit from growing a cane with a comparatively low percentage of sugar, he should never cease to aim at producing as heavy if not a heavier crop of cane with the "highest possible p.o.c.s."; and to achieve this desirable end the use of liberal supplies of manures or fertilisers will do much, particularly when suitable combinations are judiciously applied.

The water supply is an obvious controlling factor in the production of good cane fields.

No water supply can surpass the natural rain when it falls in reasonable quantities and at favourable times throughout the growing period of the cane crop. In tropical latitudes, unfortunately, the rainfall is not always exactly as is desired. Sometimes torrential downpours scour the land and beat down the cane. Sometimes the rain is too continuous,

and otherwise excellent cane soil is rendered swampy and sour, which is not beneficial to a good cane development.

In the Hawaiian Islands where the cultivation of sugar-cane has been subject to the most thorough scientific and practical investigations, and where, as the outcome of which, the average production of sugar per acre is higher than in any other cane-growing country in the world, manures costing the cane planters more than 2,000,000 dollars per annum are used, and nitrogen (mostly in the form of nitrate of soda) is the principal ingredient which constitutes by far the greatest portion in this enormous sum of money expended in a group of islands, the total area of which is 1,000 square miles smaller than the Fiji Group.

Nitrates, though of first importance in producing greater yields of sugar-cane, do not supply the probable need also of potash and phosphates. Potash has a marked influence on the carbohydrate (sugar and starch) contents of plants; and consequently, when a soil is deficient in this ingredient, it is expedient to use some sulphate of potash—say 1 cwt. to 1½ cwt. per acre—which should be incorporated in a mixture to apply at time of planting or before ratooning.

Phosphates of themselves do not seem to increase the cane yields to anything like the extent that nitrate and potash do; still, to omit using some phosphatic manure in any manurial treatment would be most inadvisable, as these manures are comparatively inexpensive, and constitute an important factor in maintaining a soil in a necessary state of general fertility.

It is confidently believed that sugar planters in Fiji will find that it is most profitable to always employ a combination of manures containing a suitable proportion of phosphates, potash, and nitrates at the time of planting or when the ratoon crops are starting their new growth. These manure mixtures should be worked or ploughed into the soil along the rows just prior to the time when the cane begins to make its main growth.

The top-dressings of nitrate of soda should be given 1 cwt. per acre (or not more than 1½ cwt.) at a time at intervals of a few weeks during the chief growing period. Two or three such top-dressings will probably be found sufficient and highly satisfactory.

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## THE MOUNT MORGAN MUNITIONS COTTON LEAGUE.

### COTTON-GROWING IN AUSTRALIA: NO COTTON, NO SHELLS.

By G. STEPHEN HART, Mount Morgan.

Many attempts have been made to grow cotton in Queensland, but the trouble of picking it has repeatedly thrown it into disfavour. That it will grow successfully is well known, but it is less generally known that in 1871 Queensland exported 602,100 lb. of cotton—over 1,300 tons

weight, valued at £79,317. That was just after the American civil war. When American cotton-growing recovered, America grew much cotton, and was anxious to sell quickly, even at a low price, and this price was too small to make cotton-growing in Australia as profitable as other crops. The return was all the smaller on account of the cotton-seed being thrown away instead of forming a by-product. From time to time the Government of the day made different efforts to re-start the industry without much success. To-day, the Government guarantees to advance 1¾d. per lb. on raw cotton, to gin it, export it, and sell it, and give any further profit obtained to the producer. On their estimated yield this should give growers more than wages. The Government do not guarantee what would be a safe minimum yield per acre, and farmers not knowing this will not venture to grow it.*

The individual farmer is not yet convinced that he could grow cotton at a profit, but now there is a national reason why he should try. Now, it is no exaggeration to say that the existence of the Empire is largely dependent on the available supply of cotton, for "no cotton, no shells" has become an accepted axiom. If ever Australia could be invaded or cut off from other lands by ocean raids we might realise to our cost, "No cotton in Australia, no shells in Australia." We have been told that a British submarine has already sunk a German super-dreadnought in the Gulf of Riga. Will it take long before submarines improve sufficiently for German submarines to sink British super-dreadnoughts? We hope it will. We hope they will never do it. But what have we to go on?

Australian cycle races were fought out on the old high "bone-shakers" until 1888, when the safety bicycle was used. In the same year Dunlop invented pneumatic tyres, but the bicycle boom did not come until 1896. This boom produced the motor cycle, and, with the powerful engines of light weight used for motor cycles, came the motor-car. Until 1896 no one could drive a motor vehicle along an English road unless preceded by a pedestrian with a red flag, and it was not until 1903 (twelve years ago) that it was thought necessary to legislate specially for motor-cars. The first motor-driven aeroplane was built in 1903, and in 1906 Santon Dumont achieved world-wide fame by flying 200 yards, for, although the Wrights had flown 24 miles the year before, their performance was not generally believed. Now, nine years later, it has been officially announced that Great Britain has 2,500 aeroplanes and Germany 2,000. Probably France has more than either. Each year they become better, and have still lighter and more powerful petrol motors. The submarine also depends upon light and powerful motors. They have

* Minimum yield in a fair season is 1,000 lb. of seed cotton per acre. In 1907 the yield ranged from 1,368 lb. to 4,250 lb. per acre.—Ed. "Q. A. J."

only been tested under war conditions for twelve months, and it is quite certain they will be much improved. Whether they will be more quickly improved by Germans than by British, French, and Americans is less certain. Still, it seems more than possible that they may seriously affect the safety of our ocean communication, and we may become, temporarily at least, more thrown on our own resources to protect ourselves from outside raids. We should remember that our AE 2 travelled 30,000 miles before her end came. What will they do next year? Nine years ago Santos Dumont flew 200 yards! And no Australian cotton means no Australian shells.

In 1909 the United Kingdom imported close upon 1,000,000 tons of raw cotton, of which 732,359 tons, valued at £41,174,869, came from the United States, and 38,399, valued at £1,724,923, from British possessions. For 10,000,000 soldiers 1 lb. of cotton per man would mean about 4,500 tons. I do not know how many pounds of high explosives made from cotton each soldier, on the average, uses in one year, but as a guide it may be taken that 1 lb. of cordite is required for about 250 rifle cartridges, and 500 lb. of cotton makes one charge for one 15-in. shell for the "Queen Elizabeth." That illustrious chemical savant, Sir William Ramsay, has, with others, been asserting, again and again, that no cotton means no shells, and has at last prevailed upon the allies to declare cotton contraband of war, and that unless we have cotton in Australia we are defenceless. Shall we grow it or import it? Or shall we sit down without it till we see if anybody comes our way?

The ultimate fate of Australia is now being decided in Europe, and patriotic Australians who are fit and free to do so are hurrying there to help; but cannot those who stay behind do something? A number of fitters are to be used in Queensland to make shells. A single lathe capable of making 20 shells a day is gladly accepted. So would a contribution of 1,000 tons—or even 100 tons—of cotton. From world statistics it may be taken that 5 acres of cotton-plants yield 1 ton of ginned cotton. The yield from perennial cotton, where unaffected by frost, is as high as 5 lb. of bolls or 2½ lb. of lint per plant. As the picking necessitates considerable labour it would seem better for many to grow small areas of up to (say) 5 acres each, rather than for individuals to attempt large plantations.

We have all over Australia, women working industriously at Red Cross work for our soldiers. Individually, each one's work may seem but a drop in the ocean, but they are showing that sufficient drops make an ocean. Why should not each of the 20,000 residents of Rockhampton and each of the 12,000 residents of Mount Morgan grow one cotton-plant? Why should not each of the 600,000 residents of Queensland grow one plant? Their little contributions could be taken to the local municipal

authorities to forward to Brisbane. The Government's advance of 1¾d. per lb. could be a good addition to our patriotic funds. But the farming community could help more largely. Many feel they cannot leave their land to become a wilderness whilst they fight a year, or two years, or three years in Europe, and many know they cannot leave their families unaided in the bush. But if they cannot give their lives they can give some of their time and energy. They can often give more time than ready cash to help the Empire. Even if there was no cash return from their cotton-growing they could do this, and cotton-growing is not unprofitable. If a man has land, let him grow some cotton, even if only a little. Let him grow what he can harvest himself or with paid labour, and then, if volunteer pickers are available, let him plant another piece to be picked by these volunteers and sent to the patriotic fund suggested above.

In these ways we should at least get sufficient cotton to help the Empire, or to help Australia if she was put to a sudden test of her internal strength, and we should all get more familiar with the cotton-growing industry, which yields its hundreds of millions worth of produce year after year. Then we should know if we could add it to our list of exports or, better still, to our list of internal manufactures.

These suggestions are put forward with the hope that they will be improved upon, and carried to a successful issue, under the guidance of those amongst us who have had many years' successful experience in cotton-growing; but we should move quickly, as seed planted in September and October or even November should produce a harvest about the close of the next European winter.

## PRACTICAL SYMPATHY FOR AN ORCHARDIST AT THE FRONT.

A splendid example of appreciation of the patriotism of a vigneron at Renmark, who enlisted in the Commonwealth Military Reserve Forces, was afforded by his fellow orchardists in September last. No less than sixty volunteers answered the call of the Renmark Agricultural Bureau to prune Reservist Starke's vineyard on Saturday afternoon, 12th September. Some had been at work the previous Saturday, and a few that morning, and the crowd in the afternoon very soon had the 5 acres of currants, malagas, and sultanas pruned clean, rods tied up, and cuttings raked off the ground. The erection of a row of trellis was also included in the afternoon's work. Arrangements were made for ploughing the land by volunteer teams and labour on the following Saturday, and Mr. Barge, who is looking after his brother-in-law's property during his absence, reckons to manage all right now till harvest. Private Starke was the first man to leave Renmark at the call to arms, and he is so far the only married man from this settlement with the troops in Europe. His grape crop was harvested by voluntary labour in the summer, and the house which he left half built has been pretty well finished off by unpaid labour and a donation from the Renmark Patriotic Fund.

# Entomology.

## CONTROL OF THE CANE BEETLE.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. E. Jarvis, Entomologist to the Bureau:—

Studies relating to the control of our common Cane Beetle (*Lepidiota albohirta*) during its grub stage are being continued, experimentation having for the most part been confined to the trial of various poison-baits.

This interesting branch of research will be carried on as long as possible, but may have to be abandoned shortly, as the majority of larvæ will soon be pupating, and in some districts have already gone down out of reach of the plough.

Prevailing dry conditions have forced cane grubs to penetrate into the ground more deeply than usual to obtain a sufficiency of moisture, and at present in localities where the soil is of a light nature it appears likely that the beetles may make an exceptionally early emergence this season.

Perfectly developed adult forms of *albohirta* are often found below ground in their pupal chambers patiently awaiting the occurrence of certain conditions of temperature and moisture conducive to a general emergence of the pest.

Odd specimens may be dormant in this way for two or even three weeks, and in abnormally wet seasons when grubs pupate near the surface have been ploughed up as early as the middle of October. It may be of interest to note that an adult specimen of *albohirta* was found in dark volcanic soil at "Green Hills" on the 28th of July, the earliest previous record of the kind at the Laboratory being 14th October, 1913.

Towards the end of July I was instructed to proceed to Mossman to attend a conference of the Australian Sugar Producers' Association, and prepare a paper reviewing the work instituted at Gordonvale Experiment Station during the past ten months.

The reading of this paper was followed by a discussion having reference mainly to the complex question of Natural Control and the possibilities of our being able to artificially enlarge its sphere of usefulness.

Speaking of predacious insects, it was pointed out that action in this direction was not always advisable in the case of indigenous species, owing to the repressive influence exercised by their hyperparasitic and other foes.

I have already stated in a previous report that knowledge of this fact need not necessarily cause us to wholly neglect such methods, or regard them as being invariably beyond our control. It is not unreasonable to assume that in a vast territory like Queensland supporting a

great variety of useful insects inhabiting widely separated districts, we might be able in some cases to derive assistance from the introduction of useful native species of local occurrence, provided they were transferred from considerable distances and without their hyperparasites and other natural enemies.

As an instance in point it may be mentioned that a chalcid parasite of our formidable sheep-maggot flies, discovered by the writer in Central Queensland on 10th October, 1913, is at present extensively bred at the Brewarrina Laboratory, and has already been distributed to sheep stations in many parts of New South Wales, where it is considered to be a very important factor in reducing the numbers of these destructive blow-flies.

Allusion was also made at Mossman to the matter of proposed importation from other countries of such useful insects as the "digger-wasp" (*Tiphia parallela*), a well-known enemy of various Scarabacidæ closely related to our cane beetles. With further reference to this parasite it may be well to mention that before introducing it into Queensland it would be necessary to take steps to ascertain if our soils and other important conditions resemble those obtaining in localities where the insect occurs naturally or has been successfully established. These investigations would have to be conducted by a capable entomologist, who, in the event of finding normal conditions practically alike in essential particulars, would then collect a large quantity of Tiphia cocoons, pack them suitably, and forward same to Australia in cold storage.

Other matters were discussed, one of which referred to the apparent scarcity of grubs in certain districts owing to causes unknown. We hope to find time to investigate cases of this kind which may afford some clue of considerable value.

In many instances, however, such immunity may reasonably be attributed to unsuitability of the soil, or the absence of food plants of the beetle in the vicinity of plantations, or possibly to a natural non-occurrence of the pest due to the presence of adverse climatic or other influences.

## CANE BEETLES AND ARTIFICIAL LIGHT.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. E. Jarvis, Entomologist to the Bureau:—

As a result of certain field experiments conducted during November and December last, acetylene light was proved to be very attractive to both sexes of our principal cane beetles throughout their aerial existence, such reaction, however, being considerably influenced by various meteorological and other conditions.

The movements of the beetles whilst flying near artificial light were studied, particularly their manner of approaching the trap and behaviour when within a foot or so of the flame; and certain conclusions were arrived at regarding the kind of design most likely to produce a serviceable light trap, and the conditions under which the latter might be expected to yield payable results. As an outcome of these observations it is proposed to construct an entirely new form of trap for trial during the coming season. Such contrivances usually aim at

capturing the insects by means of a shallow tray or pan containing water and kerosene placed under a strong lamp. This principle, however, is not to be commended in the present instance for the following reasons:—In the first place, it entails needless labour and expense, which, although small, would nevertheless be appreciable when dealing with a number of traps; secondly, it would destroy a certain proportion of useful insects, both parasitic and predaceous, which help to control not only the cane beetle in question, but a number of other insect pests of sugar-cane.

In this connection I may mention that a well-known enemy of cane grubs (*Dielis formosus*), the common "Digger Wasp," and probably beneficial Cockroach (*Ellipsidion pellucidus*, Brunn.), which frequents the foliage of sugar-cane are susceptible to the influence of artificial light. An arboreal species of earwig also, which I believe to be predaceous on small Lepidopterous larvæ of at least one of our cane pests, is attracted in great numbers.

The grey-backed Cockchafer (*Lepidota albohirta*) responds to the stimulus induced by acetylene light from a considerable distance, the phototropic influence being wellnigh irresistible, and compelling this insect to advance towards the trap. It rarely flies directly into the flame, but when within a few yards approaches in an erratic manner by a series of short flights, settling at brief intervals on the ground or on cane plants, and, finally, as though struggling against the attractive force, plunging headlong downwards at a distance of about 1 ft. or 18 in. from the light. Our new trap will be fitted with a landing stage designed to take advantage of the above habit, and immediately capture all beetles that may settle or fall upon it, and deposit them in a large chamber from which return will be impossible. Suitable exits will, of course, be provided for useful insects such as Carabidæ (predaceous ground beetles) and the various hymenopterous parasites.

The light will be protected in such manner as to throw beetles that may attempt to dash into it on to the stage below to their certain doom, but at the same time prevent the destruction of beneficial species.

By making use of a discovery relating to a peculiar habit connected with the flight of this insect when taking to wing, it will be a simple matter to prevent cane beetles from flying out of the trap.

Recent experiments with regard to the control of *Lepidiota albohirta* whilst in its larval form have for the most part given negative results, but, although apparently inconclusive, such work in reality serves a useful purpose by directing investigations into more and still more promising channels, which, owing to this gradual process of contraction, must eventually come to a focus somewhere, and in all probability reveal a pathway to discoveries of decided economic value.

Whilst stationed at Gordonvale, I have sought to embrace present opportunities for studying the life history and economy of many insect pests of sugar cane, the majority of which, although of minor importance, include a few decidedly injurious species and several hitherto undescribed forms. Such knowledge is essential to a comprehensive survey of the cane-grub problem, it being, of course, quite possible to advocate control methods that, whilst successful against one kind of pest, may destroy certain natural enemies of another, and so tend to favour an abnormal increase of the latter species.

# Botany.

## ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By J. F. BAILEY and C. T. WHITE.

No. 1.

On Three Closely Allied Weeds—Aster subulatus, *Michx.*; Erigeron canadensis, *Linn.*; and Erigeron linifolius, *Willd.*

As there has been confusion for some time past in Queensland between the two weeds *Aster subulatus* and *Erigeron canadensis* (Canada Fleabane), it has been deemed advisable to prepare this series; ray florets 20-30 scarcely exceeding the pappus, more numerous A description and figure of the closely allied *Erigeron linifolius* (Rag Weed) is given for comparison.

### *ASTER SUBULATUS*, Michx.

Annual, glabrous; stems paniculately branched, flexuous above, 1-6 ft. high, slightly angular. Stem leaves linear-lanceolate, acute, entire, sessile by a broad or slightly clasping base, 2-10 in. long, 1-8 lines wide, those of the branches very small and subulate. Flower heads numerous, 3-5 lines broad; involucre campanulate or at length hemispherical, the bracts linear-subulate, green, imbricated in 3 or 4 series; ray florets 20-30 scarcely exceedingly the pappus, more numerous than the disk florets. Achenes compressed, minutely pubescent.

This North American plant has for some time passed in Queensland as a glabrous form of *Erigeron canadensis;* but on going fully into the matter we have determined it as above. It is very abundant in cultivation paddocks and waste places about towns in Queensland. In New South Wales and Victoria it has been recorded as *Aster dumosus,* Linn, but J. H. Maiden and E. Betche, in a note in Proc. Linn. Soc. N.S.W., vol. 24 (1909), p. 363, record it as *Aster subulatus* Michx., after referring specimens to H. L. Fernald, a well-known authority on North American plants.

Although the plant is a very common weed here, we know of no local name applied to it.

### CANADA FLEABANE.

### *ERIGERON CANADENSIS*, Linn.

Annual, hispid-pubescent or glabrate; stems usually much branched; 3-10 ft. high. Lower leaves elongate-spathulate, entire or toothed, 1-4 in. long, stem leaves linear and mainly entire. Flower-heads small and very numerous, peduncles slender; involucre campanulate, the bracts narrow, acute, about 2 lines long; ray florets numerous,

Plate 18.—Aster subulatus, *Michx.*

PLATE 19.—ERIGERON CANADENSIS, *Linn.*

Plate 20.—Erigeron linifolius, *Willd.*

scarcely exceeding the involucre, more numerous than the disk florets. Achenes very small.

This North American plant—now widely spread in warm and temperate countries—has lately established itself as a weed in several places in Southern Queensland, and has become especially abundant in the Nerang and Coomera districts.

## RAG WEED.

*ERIGERON LINIFOLIUS*, Willd.

A coarse erect annual, several feet high, clothed with long soft hairs or shortly scabrous-pubescent. Radical leaves petiolate oblong, often coarsely toothed, stem leaves sessile, entire or remotely toothed, often above 2 in. long. Flower-heads rather small, pedunculate; involucre broadly ovoid or almost hemispherical, the bracts narrow, acute in 2 or 3 series; female florets very numerous shorter than the pappus, the outer ones usually dilated at the tip into a minute ligula; disk-florets few. Achenes small, pubescent.

A common tropical and sub-tropical weed indigenous in Queensland, generally known as "Rag Weed," but in some places as "Cobblers' Pegs"; this sobriquet is now, however, more commonly applied to *Bidens pilosa*.

*Eradication*—All these species being annuals, to effectively eradicate, the plants must be prevented from seeding.

## STOOLING PROCLIVITIES OF WHEAT.

Experiments comparing the yields of individual varieties per single grain sown have not been carried out by the Department, the usual course being to plant up larger areas of land so that field tests may be carried out under ordinary field conditions. The stooling proclivities of different wheats vary to a considerable extent. Winter wheats, when fed off or kept in check, have a tendency to throw out a large number of stems, possibly 50 in number. On the other hand, quick-maturing wheats rarely throw out more than three or four stems, unless fed over. It will thus be seen that comparisons as to the stooling habits of different wheats are not always an indication of their value for grain purposes. Of the three varieties—Golden King, Hermitage, and Cleveland—the two former are mid-season, moderate stooling varieties, whilst the latter usually takes a longer period to mature and stools more heavily. The name Golden King is synonymous with Gluyas Early. The heaviest stooling wheats referred to above—*e.g.*, Winter Wheats—belong to the Manitoba and Fife families. Other wheats with the same characteristics are commonly grown in cold countries.

# Vegetable Pathology.

## EXPERIMENTS WITH POISONOUS SPRAYS FOR THE DESTRUCTION OF WEEDS AT THE SUGAR EXPERIMENT STATION, MACKAY.

Some time ago it was promised that the Sugar Bureau would undertake experiments with arsenical sprays for the purpose of determining whether weeds could be successfully and economically destroyed. In the composition of the sprays used it was determined to follow the experience of other countries, and accordingly two mixtures were made up.

The first solution was made up as follows:—

8 lb. arsenic and 2 lb. caustic soda were mixed together in the dry state, and water slowly added until dissolved. Sufficient heat was generated to bring the mixture to almost boiling point. This was then made up to 5 gallons, and for use was diluted to 300 gallons.

The second solution was made in the same way as the first, but about 40 oz. of washing soda was added.

The Chemist in Charge of the Experiment Station at Mackay (Mr. L. C. McCready) states:—

The experiments were divided into two series, as follows:—

SERIES No. 1.

Sprays used on growing cane with a view to testing their effects on the destruction of weeds, and also to determine whether their use had an injurious effect on the growing cane.

SERIES No. 2.

Sprays used on open headlands solely with a view to the destruction of weeds and grasses.

No. 1. Series.

1. All ground between cane drills on inside and half the space on the outside received a fortnightly spraying at the rate of approximately 75 gallons to the acre. Great care was exercised in this case that the cane itself received none of the spray.

2. This section received the same treatment as the first section, with the exception that the No. 2 Spray formula was used.

3. This section received a spraying with No. 2 Spray formula at the same rate as Nos. 1 and 2; but in this case the cane was also sprayed around the bottoms.

No. 2 Series.

In this series two portions of headland were sprayed as under, using the same quantity per acre as in the first series:—

1. Sprayed with No. 1 Spray formula solution.

2. Sprayed with No. 2 Spray formula solution.

The spraying was at first carried out every fortnight; but, as this made little or no impression on the grass, the application was increased to a weekly spraying.

## RESULTS.

The results in No. 1 Series cannot be taken as conclusive, for the reason that when the experiment was first started the cane was well advanced in growth, and as a consequence soon reached a stage where it was impossible to walk between the rows with a spray outfit. The cane having closed-in rows, many of the softer grasses perished naturally by the exclusion of sunlight. It is, therefore, a debatable point whether the dying of some of the weeds should be attributed to the above factor or to the effects of the sprays. No positive conclusion can, therefore, be drawn from this series until the experiment is again tried on cane of younger growth.

The following notes have been made, although from the reasons stated above they must not be taken as positive:—

### SECTION 1.

Weeds such as pig weed, billy-goat weed, and red asthma were destroyed almost on the first spraying, whilst grasses such as couch and crowsfoot, beyond a slight yellowing during the first few days after spraying, soon recovered and grew as robustly as ever. Summer grass and mystery grass in some cases were killed, and in others survived.

### SECTION NO. 2.

The results in this section were identical with those found in the first section.

### SECTION NO. 3.

The effects of the spraying on this section with reference to weeds and grasses were identical with the former two sections. With regard to its effect on the cane, no real damage has been done, the cane having at the present time survived and thrown off any apparent injury.

A day or two after spraying, the leaves and bottom of the stool present a very withered and burnt looking appearance. In one or two individual cases where the spray reached into the heart of the cane sucker or shoot, the leader has been burnt out and the cane killed. According to the writer's mind, the wilting and burning of the leaves cannot fail to have anything but a prejudicial effect on the growth and vitality of the crop—first by limiting transpiration on account of the wilting of its foliage; and, secondly, by the set-back to growth, and the subsequent struggle rendered necessary to throw off the ill effects and re-establish growth.

### SERIES 2.

In this case both sprays have given equal results, and have been successful in destroying all weeds, with the exception of couch grass and crowsfoot grass. The couch at first appears wilted, but soon overcomes the effects, and three or four days after spraying has again established itself. With reference to star grass, the effects of the poison to date has failed to kill it. The individual plants are, however, very small and stunted in appearance, and there is no doubt that eventually the grass would succumb to the poisons.

The cost of material and labour amounted to £1 17s. 7d. per acre for work amongst cane rows, and £1 0s. 7d. per acre for headlands, for one spraying only.

Commenting on the above, the General Superintendent considers the growth of weeds to be too great at certain seasons of the year on our Northern canefields to be economically dealt with by means of arsenical spraying. In the red soils of Childers and Isis, where weeds do not grow to any extent, the work might be done at a considerably lower cost, and this land is similar to the Hawaiian lands where spraying was cheaply carried out.

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JULY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JULY, 1915 AND 1914, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | | Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|---|---|---|---|---|
| | July. | No. of Years' Records. | July, 1915. | July, 1914. | | July. | No. of Years' Records. | July, 1915. | July, 1914. |
| *North Coast.* | | | | | *South Coast*—continued: | | | | |
| | In. | | In. | In. | | In. | | In. | In. |
| Atherton ... ... | 0·89 | 13 | 0·40 | 0·39 | | | | | |
| Cairns ... ... | 1·14 | 27 | 3·18 | 0·35 | Nanango ... ... | 1·76 | 27 | 1·20 | 1·29 |
| Cardwell ... ... | 1·39 | 27 | 0·88 | 0·25 | Rockhampton .. | 1·58 | 27 | 0·02 | 0·08 |
| Cooktown ... ... | 0·83 | 27 | 1·91 | 1·47 | Woodford ... ... | 2·73 | 27 | 1·19 | 2·46 |
| Herberton ... ... | 0·57 | 27 | 0·22 | 0·37 | Yandina ... ... | 2·77 | 21 | 2 02 | 2·41 |
| Ingham ... ... | 1·50 | 22 | 0·71 | 0·90 | | | | | |
| Innisfail ... ... | 4·13 | 27 | 5·79 | 1·27 | | | | | |
| Mossman ... ... | 1·54 | 5 | 3·07 | 0·81 | *Darling Downs.* | | | | |
| Townsville ... ... | 0·50 | 30 | 0·14 | 0·08 | | | | | |
| | | | | | Dalby ... ... | 1·84 | 27 | 1·48 | 1·24 |
| | | | | | Emu Vale... ... | 1·50 | 17 | 2·38 | 1·12 |
| *Central Coast.* | | | | | Jimbour ... ... | 1·86 | 24 | 1·54 | 1·23 |
| | | | | | Miles ... ... | 1·69 | 27 | 1·99 | 1·94 |
| Ayr ... ... | 0·49 | 27 | 0·45 | Nil | Stanthorpe ... | 2·04 | 27 | 1·12 | 1·02 |
| Bowen ... ... | 0·67 | 27 | Nil | Nil | Toowoomba ... | 2·06 | 27 | 2·38 | 1·76 |
| Charters Towers ... | 0·47 | 27 | 0·61 | 0·48 | Warwick ... ... | 1·83 | 27 | 2·97 | 0·97 |
| Mackay ... ... | 1·34 | 27 | 1·72 | Nil | | | | | |
| Proserpine ... ... | 0·94 | 11 | 1·14 | Nil | | | | | |
| St. Lawrence ... | 1·26 | 27 | 0·10 | 0·03 | *Maranoa.* | | | | |
| | | | | | Roma ... ... | 1·40 | 25 | 0·82 | 1·04 |
| *South Coast.* | | | | | | | | | |
| | | | | | *State Farms, &c.* | | | | |
| Biggenden ... ... | 1·39 | 14 | 1·09 | 0·41 | | | | | |
| Bundaberg ... | 2·20 | 27 | 1·03 | 0·62 | Gatton College ... | 1·54 | 14 | 1·25 | 1·00 |
| Brisbane ... ... | 2·31 | 64 | 1·74 | 2·03 | Gindie ... ... | 1·23 | 13 | 0·38 | 0·35 |
| Childers ... ... | 1·76 | 19 | 1·64 | 0·99 | Kamerunga Nurs'y | 1·35 | 23 | 2·71 | 0·55 |
| Crohamhurst ... | 2·85 | 20 | 2·16 | 2·61 | Kairi ... ... | 0·49 | 3 | 0·50 | 0·58 |
| Esk ... ... | 2·11 | 27 | 1·12 | 0·88 | Sugar Experiment | | | | |
| Gayndah ... ... | 1·65 | 6 | 0·58 | 0·55 | Station, Mackay | 1·36 | 16 | 0·94 | Nil |
| Gympie ... ... | 1·97 | 27 | 1·66 | 1·36 | Bungeworgorai ... | 0·73 | 3 | 0·66 | 1·18 |
| Glasshouse M'tains | 2·65 | 6 | 1·54 | 2·52 | Warren ... .. | ... | ... | Nil | 0·13 |
| Kilkivan ... ... | 1·87 | 27 | 0·95 | 1·58 | Hermitage ... | 1·49 | 7 | 3·17 | 0·78 |
| Maryborough ... | 2·13 | 27 | 1·60 | 0·68 | | | | | |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for July this year and for the same period of 1914, having been compiled from telegraphic reports are subject to revision.

This return was inadvertently omitted from the September issue of the Journal.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF AUGUST IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING AUGUST, 1915 AND 1914, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | | Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|---|---|---|---|---|
| | Aug. | No. of Years' Records. | Aug., 1915. | Aug., 1914. | | Aug. | No. of Years' Records. | Aug., 1915. | Aug., 1914. |
| *North Coast.* | In. | | In. | In. | *South Coast*—continued: | In. | | In. | In. |
| Atherton ... ... | 0·91 | 13 | Nil | 1·18 | | | | | |
| Cairns ... ... | 1·48 | 27 | 0·06 | 4·93 | Nanango ... ... | 1·55 | 27 | 1·42 | 0·18 |
| Cardwell ... ... | 1·16 | 27 | Nil | 1·19 | Rockhampton ... | 0·97 | 27 | 0·41 | Nil |
| Cooktown ... ... | 1·28 | 27 | 0·23 | 7·22 | Woodford ... ... | 2·05 | 27 | 1·22 | 0·89 |
| Herberton ... ... | 0·65 | 27 | Nil | 1·10 | Yandina ... ... | 2·18 | 21 | 0.90 | 1·73 |
| Ingham ... ... | 1·44 | 22 | 0·04 | 0·54 | | | | | |
| Innisfail ... ... | 5·30 | 27 | 0·43 | 10·53 | | | | | |
| Mossman ... ... | 1·58 | 5 | 0·34 | 2·36 | *Darling Downs.* | | | | |
| Townsville ... ... | 0·40 | 30 | 0·53 | 0·03 | | | | | |
| | | | | | Dalby ... ... | 1·26 | 27 | 1·18 | 0·39 |
| | | | | | Emu Vale ... ... | 1·36 | 17 | 1·72 | 0·17 |
| *Central Coast.* | | | | | Jimbour ... ... | 1·41 | 24 | 2·25 | 0·37 |
| | | | | | Miles ... ... | 1·23 | 27 | 1·51 | Nil |
| Ayr ... ... ... | 0·40 | 27 | 0·38 | Nil | Stanthorpe ... | 1·72 | 27 | 1·60 | 0·31 |
| Bowen ... ... | 0·68 | 27 | 0·51 | 0·09 | Toowoomba ... | 1·89 | 27 | 1·54 | 0·44 |
| Charters Towers ... | 0·44 | 27 | Nil | Nil | Warwick ... ... | 1·59 | 27 | 1·66 | 0·15 |
| Mackay ... ... | 1·19 | 27 | 0·88 | 0·32 | | | | | |
| Proserpine ... ... | 0·77 | 11 | 0·99 | 2·13 | | | | | |
| St. Lawrence ... | 1·15 | 27 | 0·40 | 0·28 | *Maranoa.* | | | | |
| | | | | | Roma ... ... | 1·04 | 25 | 1·45 | Nil |
| *South Coast.* | | | | | | | | | |
| | | | | | *State Farms, &c.* | | | | |
| Biggenden ... ... | 1·27 | 14 | 1·82 | 0·44 | | | | | |
| Bundaberg ... ... | 1·56 | 27 | 1·31 | 0·36 | | | | | |
| Brisbane ... ... | 2·27 | 64 | 1·60 | 0·29 | Gatton College ... | 1·49 | 14 | 1·62 | 0·25 |
| Childers ... ... | 1·33 | 19 | 0·48 | 0·84 | Gindie ... ... | 0·74 | 13 | 1·29 | Nil |
| Crohamhurst ... | 2·37 | 20 | 1·86 | 2·07 | Kamerunga Nurs'y | 1·54 | 23 | 0·05 | 3·49 |
| Esk ... ... ... | 1·75 | 27 | 1·99 | 0·24 | Kairi ... ... | 0·81 | 3 | Nil | 2·24 |
| Gayndah ... ... | 1·22 | 27 | 1·32 | 0·16 | Sugar Experiment | | | | |
| Gympie ... ... | 1·65 | 27 | 1·47 | 1·31 | Station, Mackay | 0·84 | 16 | 1·05 | 0·21 |
| Glasshouse M'tains | 1·72 | 6 | 1·45 | 1·13 | Bungeworgorai ... | 0·40 | 3 | 1·20 | Nil |
| Kilkivan ... ... | 1·42 | 27 | 1·23 | Nil | Warren ... ... | 0·12 | 3 | 0·18 | Nil |
| Maryborough ... | 1·59 | 27 | 1·21 | 1·62 | Hermitage ... | 1·90 | 7 | 1·98 | Nil |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for August this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

## RATION FOR A BULL.

Mr. J. C. Brünnich, Agricultural Chemist, in reply to a correspondent, gives the following complete ration for fattening a bull for show purposes:—

Sugar-cane tops require to be fed at the rate of 50 to 60 lb. daily per 1,000 lb. live weight, if the ration is balanced by the addition of 2 lb. of bran and ¾ lb. of linseed meal for every 20 lb. of chop-chop. Should the ration be found to be too laxative, the bran can be replaced by an equal amount of crushed corn for a time.

If possible, the above ration should be supplemented by a little bush hay.

# General Notes.

## QUEENSLAND AGRICULTURAL COLLEGE.

### BURSARIES.

An Examination will be held on the 14th December next in Brisbane and elsewhere, according to where the candidates reside, for Four (4) Bursaries at the Queensland Agricultural College, tenable for three years. Candidates must not be less than 15 or more than 18 years of age on the 1st January, 1916. Nominations close on the 16th November, 1915. Further particulars can be obtained upon application to the Under Secretary, Department of Agriculture and Stock, Brisbane.

## THE NORIT PROCESS OF MANUFACTURING WHITE SUGAR.

The "International Sugar Journal" contains an account of a lecture by Dr. A. Wijnberg on "The Norit Process of Manufacturing White Sugar." In this process it is claimed that the colouring matter of the juice is removed by means of so-called 'decolourising carbon' (manufactured under the name of Norit) in the same manner that this is effected by animal charcoal in the sugar refinery. This substance has already been successfully employed for bleaching purposes in various industries, but hitherto has not been used in sugar works, partly on account of its cost and partly because a method of regenerating was not known.

It is now found that the decolourising colour of Norit can be very largely restored by boiling for fifteen minutes with a 3 per cent. solution of caustic soda.

Norit is stated to exert its decolourising action on slightly acid sugar solutions, the colour being only slightly or not at all removed when the solution is alkaline. The author explains this action by reference to the properties of colloids of the nature of pectin which are transformed into larger molecular groupings in feebly acid solutions, but into smaller ones in alkaline. The larger molecular groups are held by the decolourising carbon, while the smaller ones are not.

It is claimed that the decolourising power of Norit is about twenty-five times greater than granular animal charcoal. Its decolourising power is relatively greater in dilute sugar solutions as compared with concentrated ones; hence it is recommended to use Norit to bleach the juice rather than syrup. Norit is stated to possess the advantage of removing pectins and gums from sugar solutions, so that juice decolourised by this means is more easily filtered.

A continuation of the article is promised, in which the practical results obtained in certain factories and refineries will be considered.

## TANNING SKINS.

The Sydney "Town and Country" gives the following as a "lightning tanning process":—

The lightning or sulphuric acid process is the quickest method of tanning wallaby, rabbit, and other skins, and is a very simple one. Pour five or six quarts of boiling water over two quarts of bran, and then strain the infusion. Make an equal quantity of salt water, by adding to blood-warm water as much salt as will dissolve. Mix the bran and salt water, and to each gallon of the mixture (when no more than lukewarm) add an ounce of sulphuric acid ($H_2SO_4$). Immerse the skins in the liquor, stirring them occasionally till tanned, which will be in about twenty minutes. When tanned, rinse in clean water, and hang out in shady place to dry. Pull and stretch them well while drying. By sufficient pulling they can be made quite white. Dry skins should be soaked in warm water before tanning till they are quite soft, and all flesh and grease should be well cleansed from them.

## DESTROYING BOX AND SANDAL WOOD SUCKERS.

Mr. H. C. Quodling, Director of Agriculture, advises:—

"Round leaf box is always a difficult class of timber to kill owing to its predisposition to throw up suckers from surface roots, or after ring-barking, and more so when the operation is carried on at the wrong time of the year. The sap must be active. April and May are the months during which ring-barking will be generally satisfactory. Grubbing or cutting down suckers represents a good deal of work, but many persons are prone to grub effectively as the surest course, rather than risk cutting down the suckers, and the splitting of the butt simultaneously, to be followed by the application of arsenical solution.

"Strong plant poison is made up by boiling 2 lb. of arsenic and 1 lb. of caustic soda for an hour in 2 gallons of water—make up to 2 gallons with boiling water. Use a watering can after removing the rose. The spout should be plugged to allow the liquid to ooze out and be absorbed into the split butt."

## THE QUEENSLAND COTTON CROP.

Arrangements have again been made by the Department of Agriculture to handle the cotton crop throughout Queensland. The farmers will receive an advance of 1¾d. per lb. on all cotton in seed delivered in Brisbane. The Officers of the Department will gin the cotton and dispose of the clean lint, and if there should be any net profit, after paying all expenses, the amount will be handed over to the grower. It is further announced that the Department will supply suitable seed to any intending grower of cotton, free of cost, and will pay railway freight to the station nearest to the applicant's farm. Seed will be available early in October.

## PRICKLY-PEAR IN EGYPT.

The accompanying photograph of a prickly-pear plantation at Heluan, in Egypt, is interesting as indicating that the Egyptians use the plant as food for stock, where, possibly, there is a scarcity of other fodder. The photograph was taken by an officer of the British forces

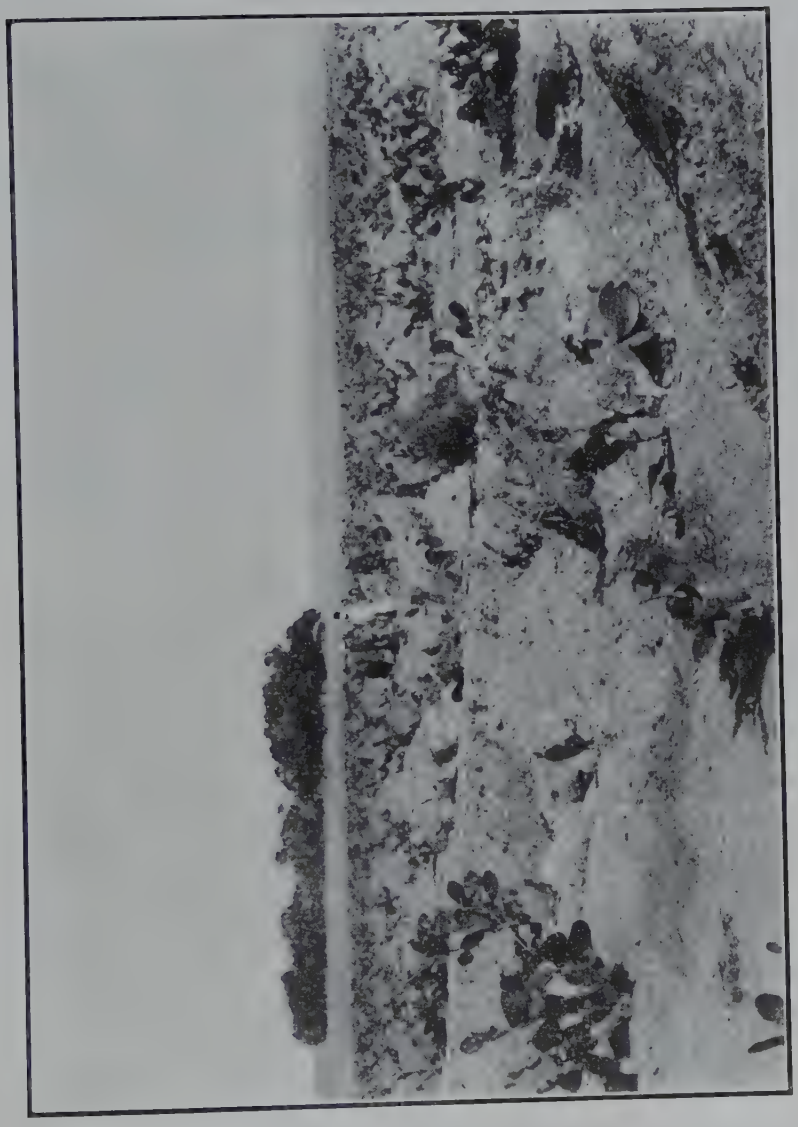

Plate 21.—Prickly-pear Plantation in Egypt.

in Egypt. He did not know, or did not state, what use was made of the plant; but it could only be used as fodder, or for the fruit. We have seen, at Cairo, baskets of prickly-pear fruit for sale in the market. Heluan is a place on the Nile, about 16 miles south of Cairo.

## TO KEEP FLIES FROM HORSES' EYES.

The skin around the eyes should be painted daily with the following dressing:—

Spirits of tar, 1 oz.; olive oil, 5 oz.

## TO DESTROY ZAMIA PLANTS.

Mr. J. F. Bailey, Government Botanist, says that the usual mode adopted for killing the plant is to chop a notch in the trunk and then bore a large hole from the notch to the centre of the pith. The hole is filled with arsenic, and the plant soon dies.

## USEFUL MEDICINES ON THE FARM.

As regards medicines for horses, &c., the most useful on a farm are—Raw linseed oil, turpentine, and baking soda, the dose for a horse being 2 oz. turpentine, 1 pint linseed oil, and 2 oz. baking soda. In severe or doubtful cases the services of a qualified veterinary surgeon, if available, should be requisitioned.

## NON-GERMINATION OF PINEAPPLE SEEDS.

With regard to pineapple seeds failing to germinate, Mr. C. Ross, Instructor in Agriculture, states that pineapple seed should be planted immediately after being taken from the fruit. The seed germinates very irregularly, and it is usual for many misses to occur. If sown in light, well-drained loam, properly shaded and watered, a fair proportion should result. There is no secret in raising pineapple seed, and Mr. Ross is at a loss to account for failures.

## HOW TO COOK VEGETABLES.

First of all, the vegetables should be thoroughly cleansed. If fresh gathered and perfectly free from insects and dirt, vegetables preserve their colour in boiling much better when not previously wetted. If blighted, or in any respect dirty, remove all that can be removed before wetting—that is, trim away the outside leaves and roots, leaving no more than is to be actually boiled and eaten. This applies to cabbage, broccoli, and cauliflowers. Having carefully trimmed them, let them lie an hour or more in a pan of spring water and salt. Observe to plunge them into the water, not to pump or pour water upon them, which would make them flabby. Immediately before putting them into the saucepan, take them out of the water and shake them well in a colander or thin straining cloth that every drop of cold water may run off. In trimming vegetables do not be too saving; one tough outside leaf will spoil a whole dish; strip till you come to tender quick-grown leaves; and in cabbages shave the stem and also the stalks of the outer leaves. Salad and radishes should be washed in water without salt. Celery requires half an hour or more to soak. A brush, somewhat resembling a plate brush, is very useful in cleaning the root end of the celery.

Green peas, French beans, and broad beans require no washing. They should be cut or shelled just before boiling. It sometimes, however, happens to suit to shell peas an hour or two earlier; if so, they should be covered with the shells, and placed on the stones or bricks in a shady room.

Asparagus, if quite fresh, need not be washed; tie them with bass or tape, in bundles of twenty-five or thirty each, making all the heads lie level, and cut the stalks to an equal length.

Turnip greens, if cleanly gathered and carefully trimmed, need no washing. Only the hearts and stems are to be used. The latter should be skinned. But turnip greens grown on sandy land, especially after heavy rains, require to be washed in several waters.

Spinach should be picked leaf by leaf, and washed in several waters, and afterwards thoroughly drained.

The stalks of white beet for boiling, as well as those of rhubarb for pies or puddings, should be skinned.

Red beetroots should be well washed and scrubbed, but not scraped with a knife, as that would discharge the rich juice and the bright colour. Potatoes and Jerusalem artichokes should be scrubbed with a birch broom or scrubbing-brush and washed very clean, just before boiling. They should not be wetted at all till they are about to be used. Carrots and parsnips should be well scrubbed and washed. After boiling, rub off the skins with a coarse cloth. New potatoes are done in the same manner. In spring, when potatoes become old and specky, it is better to peel them raw, carefully removing the specks. This must be done with a knife. Afterwards rinse the potatoes, and either steam them or boil for mashing or for browning under meat.

Onions, Leeks, and Shalots.—Take off as many coats of the skin as are at all slimy or tough. For roasting onions should not be skinned or washed, but merely wiped from dust. Young spring onions are served with the green tops, merely the roots and one thin skin being removed. Artichokes should be soaked an hour or more before boiling.

Now, with regard to dressing vegetables, one general set of rules may serve for all green vegetables. 1. A tin saucepan that shuts close, large enough to allow plenty of water. 2. The water fast boiling the moment of putting in the vegetables, but not having boiled before nor been allowed to stand on the hob. The quicker the water comes to boil at first, and again when the vegetables are put in, the sooner they become tender, and the better they preserve their colour. 3. A brisk fire that will cause the water to boil up again quickly. 4. A small quantity of common salt to be put in with the vegetables—not before. A tablespoonful of salt is sufficient for a large dressing of greens; half that quantity for peas. 5. The instant the vegetables are put in shut the lid close, and do not lift it up again until it is forced up by rapid boiling; when this is the case, remove it, and do not return it again. 6. When the vegetables are nearly done, have quite ready a colander and slice or wire ladle with which to take them up; do not pour the water through them, but carefully lift them out with the ladle into the colander. 7. Shake them carefully in the colander to drain before putting them into the vegetable dish. Spinach should be pressed between two trenchers.

N.B.—The boiling of green vegetables may be expedited, the colour preserved, and if they are old and tough they may be made tender by putting in with them a small quantity of soda, half a teaspoonful of carbonate of soda, or a bit of washing soda the size of a small hazel-nut, is enough for a moderate dressing. This is not suitable for potatoes or roots in general; it spoils their colour, though it improves that of greens.

# Answers to Correspondents.

## TO SMOTHER COUCH GRASS.

In reply to a correspondent making inquiries on the subject of a suitable crop to smother couch grass, Mr. H. C. Quodling, Director of Agriculture, advised in August, as follows:—

"Panicum is probably the quickest growing crop for the purpose. Some trials carried out at the Agricultural College when there was a plentiful supply of moisture and warmth, a crop of panicum matured in seven weeks from the date the seed was sown, and gave a return equal to 8 tons of green fodder per acre. It may be pointed out that everything was in favour of this crop, particularly in the matter of preparation of the land, which had been lying fallow for some time previously. Siberian millet is not as quick a grower as panicum, but it spreads and stools to a greater extent. Japanese millet can also be recommended as a smothering crop, but it must be understood that all of these varieties revel in heat and moisture, and at this time of the year it is unlikely that you will get the same growth and progress as in the rainy season. Cowpeas (black for preference) are favoured as a smothering crop for couch, but it is not to be expected that they will get ahead of the grass unless the latter is kept well in check before planting time. Couch destruction is brought about effectually by shallow cultivation during the warm weather, keeping the grass on the surface, and knocking it about with implements to expose the roots to the drying action of the sun."

## SEED OF A GRAFTED ORANGE.

"Orchardist," Wolvi, Gympie—

Your question as to whether the seed of a grafted orange will produce fruit, or go back to the original stock on which the scion was grafted, was submitted to the Director of Fruit Culture, Mr. A. H. Benson, who states that the seed from a grafted orange tree, if sown, will produce an orange, not necessarily, however, of the same type as its parent, as there is always the danger of inoculation by bees or other insects. It is not possible for the seed of an orange mated, say, on a lemon or citron stock to produce a lemon or citron. Copies of Mr. Benson's Bulletin on Citrus Culture and Pineapple Growing have been forwarded to you, and in them you will find answers to the questions on which you desire information. It would certainly be advisable to have the soil analysed. Directions for the collection of samples and scale of fees payable have been also sent to you. Send the samples of soil to the Agricultural Chemist, Department of Agriculture and Stock.

The planting seasons for Citrus fruits in the Southern coast districts are from May to August, and again in February. It is not too late to plant during this month (September) if the weather should prove favourable.

## DESTRUCTION OF ANTS.

We frequently receive letters asking for a remedy against ants of all kinds. With a view to satisfying inquiries we published in the issue of this Journal for November, 1913, several remedies more or less effective in dealing with the most common varieties of ants. These were:—

### DESTRUCTION OF ANT HILLS.

As the hot weather approaches, those pests of the State, ants of all sorts and descriptions, become lively, and begin to infest house and field. Then, on all sides, the question is heard: "How can we get rid of the ants?"

In the case of the extensive "antdoms" of the blue meat ant, a good way to exterminate them is to cover the gravelly nests with weed chippings from the garden. This proceeding appears greatly to trouble the insects, probably because the dry weeds prevent them from safely depositing the quantities of small stones and gravel they carry up from below the surface of the soil.

Failing this remedy, the best method of dealing with these ants in a large nest is to make several holes with a bar or broom handle to the depth of a few inches in different parts of their habitation. Pour into each hole about a tablespoonful of carbon bi-sulphide, and then cover the whole nest with a blanket. The heavy fumes of the insecticide will permeate the ant hill, killing all insect life. The operation may be made more effective by exploding the vapour under the blanket by the aid of a light on the end of a pole. This drives the poisonous fumes throughout the nest, rendering them more fatal to the inmates. The best time for this treatment is towards the evening, when most of the ants will be at home.

### SOLDIER AND JUMPER ANTS

can be effectually destroyed by this process.

Another good remedy is to pour half a pint of gasoline into the hill or nest, and set it afire. The gasoline will instantly spread through all the galleries of the nest, and, as the heat on the surface increases, the gas will generate in the utmost recesses and the fire will cook the ants. Half a pint of gasoline will burn from three to eight hours, and every ant in the nest, or attempting to enter, will be destroyed.

### TO CLEANSE A CUPBOARD

infested with red or black ants, all the shelves should be washed with carbolic acid and water, or carbolic soap. If the scent of the carbolic is offensive, as it is to some persons, use the following:—A large lump of ammonia dissolved in hot water, and more cold water added. The proportion is—ammonia the size of a hen's egg to a quart of water. Brush the shelves well over with it. The ants will quickly leave, as they dislike the scent of ammonia.

## TO KEEP ANTS AWAY FROM TREES.

| | |
|---|---|
| Take White Lime (slaked) .. .. .. | 6 quarts. |
| Kerosene oil .. .. .. .. | ½ pint. |
| Turpentine .. .. .. .. | 1 wineglass. |
| Soft soap .. .. .. .. | 5 lb. |
| Cow manure .. .. .. .. | 3 quarts. |
| Water .. .. .. .. .. | 16 quarts. |

Mix the whole thoroughly together, and apply freely with a paint brush to the trunks of trees or shrubs.

It is said that trees can be protected against ants by saturating woollen strings with castor oil, and tying them tightly round the trunk. The ants go up as far as the strings, but none will cross them. Cotton strings will not do. Woollen yarn must be used.

## TO GET RID OF BLACK ANTS.

Mix 10 parts of sugar with 100 parts of water, and boil. Cool, and then add 1 part of tartar emetic, and stir. Set this about in tins covered with muslin or wire netting. A very similar method is to use in exactly the same way a mixture of 1 oz. of jam or syrup and 10 grains of finely powdered corrosive sublimate.

Another remedy, involving no poison, is to soak a piece of sponge in sweetened water. When it is full of ants, drop it into boiling water, and sweeten afresh for a second lot of ants. Ants are curiously intelligent when once they have grasped the idea; so they keep away.

A third remedy: Mix flour, sugar, and arsenic to the consistency of putty with water, and place pieces of the mixture about the nests of the ants. If an examination is made in a few days after using this remedy, hundreds of dead ants will be found in the vicinity of the poison; and it is very unlikely that the ants will reappear on a spot where the mixture has been used.

## TO PREVENT ANTS CLIMBING FRUIT TREES.

If chalk is rubbed on the bark of a tree, it will absolutely prevent ants from climbing. If they are above it, they fall the instant they set foot on the chalk when descending. They appear to lose their foothold. The correspondent who supplies this information mentions his experiment with a nectarine tree which was covered with black aphis. Observing that there was a continuous stream of black ants ascending and descending, he smoothed the bark of the steam to a width of about 6 or 7 in., and rubbed this space with chalk. The chalk was renewed from time to time as it fell or was washed off. That year there was not an aphis or black leaf on the tree, nor had there been any since. The ants, cut off from their food supply, were exterminated. "A chalk ring," he says, "drawn round a sugar ants' nest is equally effective." This is worth a trial, as, if successful, chalking the legs of tables and meat safes would preserve the contents from the ants.

Another way of preventing ants from climbing is said to be cheap and effective. Tie a rabbit skin (upside down, tail up the tree), fur

outwards, tightly round the stem. The ants start to climb up the fur, and as they reach the end of each single hair, the hair drops and lets them down. The ants always give it us as a bad job.

## REMEDIES FOR WHITE ANTS ATTACKING LIVING TREES.

There are two ways in which the pests may be got rid of—one by arsenical poisoning; the other by the use of bisulphide of carbon, as already described. For the first plan, get 3d. worth of arsenic, and pound it as fine as flour. Next, collect as many ants as possible, mix the ants with the arsenic, some molasses, and a little soil. Make this into a ball, and place it near the ants' nest. The living ants will devour the dead ones, and their followers will devour them. Thus there will be an end of them.

A good remedy is apterite, which is destructive to most insect life when chipped into the ground, and is not harmful to plants.

Sugar and arsenic spread between slips of pine wood, and covered with an inch of soil, is a good trap for white ants.

## GREEN HEAD ANTS.

These are most difficult to deal with, as they make their nests in inaccessible places and run long galleries out to some distance. Unless the nests can be located and bisulphide poured into them, there is little hope of getting rid of them.

## ANT EXTERMINATION GENERALLY.

For the extirpation of ants the following remedies are good. To be effective, they require attention and perseverance. It is well to find their main burrow or nest, if possible. Arsenic is sure destruction to them, but it is dangerous to handle:—

Air-slaked lime plentifully dusted in warm dry weather over and around the hills, or in the house or other places infested, will cause the ants to vacate them in a short time.

Snuff: Dust a little snuff upon the floor of the rooms or pantry.

Draw a thick chalk line around a smooth tree or across an upright board or post, and they will not pass over it.

Camphor: Put a piece of camphor, the size of a filbert nut, into 2 quarts of hot water. When cold, apply to pot and other plants, and the insects will be driven off without injury to the plants.

Mix together 1 part of calomel and 10 parts of finely powdered white sugar, and lay it in little heaps about their nests and runs. The ants will eat it and die.

Coal oil, mixed with six times its bulk of water, sprinkled over the nests every few days, will kill and drive them away.

Pans or saucers, nearly filled with honey or sweet oil, attract ants, and they are drowned in it.

Flowers of sulphur, ½ lb.; potash, 4 oz. Set in an earthen vessel over the fire until dissolved and united. Afterwards beat to a powder.

Infuse a little of the powder in water and sprinkle in places infested with ants.

To Destroy Black Ants: A few leaves of green wormwood scattered among the haunts of black ants will drive them away.

Red Ants: Powdered borax sprinkled around will exterminate both red and black ants.

Make holes in the ant hills, 6 in. deep and 1 ft. apart, with an iron or zinc tube fitted with a wooden stake. Withdraw the stake. Pour 1 tablespoonful of bisulphide of carbon down the tube. Withdraw the tube and stop the hole immediately. Bisulphide of carbon is very inflammable.

## RECORD PRICE FOR A PIG.

A correspondent writes from Tinana, Maryborough, that, at the monthly sales held on the 7th September, high prices ruled throughout for pigs, the reason being probably, the very great demand by the bacon factories. Very brisk bidding took place for a fine "backfatter," sold on behalf of Mr. Chas. Fortey, of Newtown. The bids ran up to £7 17s. 6d., which is easily a record for a pig in Queensland sold for commercial purposes. It would be interesting to know how this pig panned out in the way of bacon, hams, and sundries in the factory.

## A SYMPTOM OF WORMS IN SHEEP.

A correspondent at Cloncurry, who last year lost 20 per cent. of his lambs, noticed that, at about from three to six months old, they developed a lump under the throat, and wrote to the Department for advice on the matter. Mr. W. G. Brown, Instructor in Sheep and Wool, advised as follows:—

One of the most decisive symptoms of worms in sheep is the lump under the jaw. The fact that lambs from four to six months old die from this complaint is a very strong corroboration of intestinal or stomach worms. If these lambs be drenched with a suitable drench, they should not die. If the fourth stomach were opened, twisted wire-worms in thousands would be found. Mr. Brown sent directions for making the drench, which, he said, would be found so effective that it was a certainty that no drenched lambs would die of stomach worms.

# TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

(From which those at places west of Brisbane can be reckoned.)

Computed by D. EGLINTON, F.R.A.S.

| Date. | September. | | October. | | November. | | December. | |
|---|---|---|---|---|---|---|---|---|
| | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·4 | 5·33 | 5·30 | 5·47 | 4·59 | 6·4 | 4·46 | 6·27 |
| 2 | 6·3 | 5·33 | 5·29 | 5·48 | 4·58 | 6·4 | 4·46 | 6·28 |
| 3 | 6·2 | 5·34 | 5·28 | 5·48 | 4·58 | 6·5 | 4·46 | 6·28 |
| 4 | 6·1 | 5·34 | 5·27 | 5·49 | 4·57 | 6·6 | 4·46 | 6·29 |
| 5 | 6·0 | 5·35 | 5·26 | 5·49 | 4·57 | 6·6 | 4·46 | 6·29 |
| 6 | 5·59 | 5·35 | 5·25 | 5·50 | 4·56 | 6·7 | 4·46 | 6·30 |
| 7 | 5·58 | 5·36 | 5·24 | 5·50 | 4·55 | 6·8 | 4·46 | 6·30 |
| 8 | 5·57 | 5·36 | 5·23 | 5·51 | 4·54 | 6·9 | 4·47 | 6·31 |
| 9 | 5·56 | 5·37 | 5·22 | 5·51 | 4·53 | 6·10 | 4·47 | 6·32 |
| 10 | 5·55 | 5·37 | 5·21 | 5·52 | 4·53 | 6·11 | 4·47 | 6·33 |
| 11 | 5·53 | 5·38 | 5·20 | 5·52 | 4·52 | 6·11 | 4·47 | 6·34 |
| 12 | 5·52 | 5·38 | 5·19 | 5·53 | 4·51 | 6·12 | 4·47 | 6·35 |
| 13 | 5·50 | 5·38 | 5·18 | 5·53 | 4·51 | 6·12 | 4·48 | 6·36 |
| 14 | 5·49 | 5·39 | 5·17 | 5·54 | 4·50 | 6·13 | 4·48 | 6·36 |
| 15 | 5·48 | 5·39 | 5·16 | 5·54 | 4·50 | 6·14 | 4·48 | 6·37 |
| 16 | 5·46 | 5·40 | 5·15 | 5·55 | 4·49 | 6·15 | 4·49 | 6·38 |
| 17 | 5·45 | 5·40 | 5·14 | 5·55 | 4·49 | 6·16 | 4·49 | 6·38 |
| 18 | 5·44 | 5·41 | 5·13 | 5·56 | 4·48 | 6·16 | 4·50 | 6·39 |
| 19 | 5·43 | 5·41 | 5·12 | 5·56 | 4·48 | 6·17 | 4·50 | 6·39 |
| 20 | 5·42 | 5·42 | 5·11 | 5·57 | 4·48 | 6·18 | 4·51 | 6·40 |
| 21 | 5·41 | 5·42 | 5·10 | 5·57 | 4·48 | 6·19 | 4·51 | 6·40 |
| 22 | 5·40 | 5·43 | 5·9 | 5·58 | 4·47 | 6·20 | 4·52 | 6·41 |
| 23 | 5·39 | 5·43 | 5·8 | 5·58 | 4·47 | 6·21 | 4·52 | 6·41 |
| 24 | 5·37 | 5·44 | 5·7 | 5·59 | 4·47 | 6·21 | 4·53 | 6·41 |
| 25 | 5·36 | 5·44 | 5·6 | 5·59 | 4·47 | 6·22 | 4·53 | 6·42 |
| 26 | 5·35 | 5·45 | 5·5 | 6·0 | 4·47 | 6·23 | 4·54 | 6·42 |
| 27 | 5·33 | 5·45 | 5·4 | 6·0 | 4·47 | 6·24 | 4·54 | 6·42 |
| 28 | 5·32 | 5·46 | 5·3 | 6·1 | 4·47 | 6·25 | 4·55 | 6·43 |
| 29 | 5·31 | 5·46 | 5·2 | 6·1 | 4·47 | 6·26 | 4·55 | 6·43 |
| 30 | 5·30 | 5·47 | 5·1 | 6·2 | 4·47 | 6·27 | 4·56 | 6·44 |
| 31 | ... | ... | 5·0 | 6·3 | ... | ... | 4·56 | 6·44 |

## Phases of the Moon, 1915.

On or about the 150th Meridian, East Long.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 2 Sept. | ☽ | Last Quarter | 12 | 56 | a.m. |
| 9 „ | ● | New Moon | 8 | 52 | p.m. |
| 16 „ | ☾ | First Quarter | 5 | 21 | „ |
| 23 „ | ○ | Full Moon | 7 | 35 | „ |

The moon will be at its least distance from the earth, roughly about 226,000 miles, on 14th September; and at its greatest distance, about 252,000 miles, on 2nd and 30th September.

| | | | | | |
|---|---|---|---|---|---|
| 1 Oct. | ☽ | Last Quarter | 7 | 44 | p.m. |
| 9 „ | ● | New Moon | 7 | 42 | a.m. |
| 15 „ | ☾ | First Quarter | 11 | 51 | p.m. |
| 23 „ | ○ | Full Moon | 10 | 15 | a.m. |
| 31 „ | ☽ | Last Quarter | 2 | 39 | p.m. |

The moon will be at its least distance from the earth on 11th October, and at its greatest distance on the 27th.

| | | | | | |
|---|---|---|---|---|---|
| 7 Nov. | ● | New Moon | 5 | 52 | p.m. |
| 14 „ | ☾ | First Quarter | 9 | 3 | a.m. |
| 22 „ | ○ | Full Moon | 3 | 36 | „ |
| 30 „ | ☽ | Last Quarter | 8 | 10 | „ |

The moon will be at its least distance from the earth at midnight on 8th November, and at its greatest distance on the morning of the 24th.

| | | | | | |
|---|---|---|---|---|---|
| 7 Dec. | ● | New Moon | 4 | 3 | a.m. |
| 13 „ | ☾ | First Quarter | 9 | 38 | p.m. |
| 25 „ | ○ | Full Moon | 10 | 52 | „ |
| 29 „ | ☽ | Last Quarter | 10 | 59 | „ |

The moon will be at its least distance from the earth on the morning of 7th December, and at its greatest distance on the morning of the 21st.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 17 m., 28 m., 36 m., and 47 minutes, respectively, later than at Brisbane at this time of the year.

At Roma, on 1st September, the sun will rise about 6·19 and set about 5·51; on 1st October it will rise about 5·46 and set at about 6·4; on 1st November it will rise about 5·18 and set at about 6·20; on 1st December it will rise about 5·7 and set at about 6·41.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed by D. Eglinton, F.R.A.S., and should not be reproduced without acknowledgment.]

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR SEPTEMBER, 1915.

| Article. | | SEPTEMBER. |
|---|---|---|
| | | Prices. |
| Bacon | lb. | 1s. 1d. to 1s. 2½d. |
| Bran | ton | £6 15s. |
| Broom Millet | „ | ... |
| Butter | cwt. | 140s. |
| Chaff, Mixed | ton | £11 to £12 |
| Chaff, Oaten | „ | £12 to £14 10s. |
| Chaff, Lucerne | „ | £15 to £20 |
| Chaff, Wheaten | „ | £5 10s. to £10 |
| Cheese | lb. | 10d. to 10½d. |
| Flour | ton | £17 5s. |
| Hams | lb. | 1s. 1d. to 1s. 2d. |
| Hay, Oaten | ton | £16 |
| Hay, Lucerne | „ | £9 to £15 |
| Honey | lb. | 3½d. to 4d. |
| Maize | bush. | 5s. 7d. |
| Oats | „ | 6s. 3d to 7s. 6d. |
| Onions | ton | £10 10s. |
| Peanuts | lb. | 3d. to 3½d. |
| Pollard | ton | £7 10s. |
| Potatoes | „ | £11 to £13 10s. |
| Potatoes (Sweet) | cwt. | 6s. 9d. to 7s. 9d. |
| Pumpkins | ton | £6 to £8 |
| Eggs | doz. | 11½d. to 1s. |
| Fowls | pair | 4s. 9d. to 6s. |
| Ducks, English | „ | 4s. to 4s. 3d. |
| Ducks, Muscovy | „ | 5s. to 6s. |
| Geese | „ | ... |
| Turkeys (Hens) | „ | 8s. 6d. |
| Turkeys (Gobblers) | „ | 16s. to 18s. |
| Wheat | bush. | 9s. |

### VEGETABLES.

| | |
|---|---|
| Cabbages, per dozen | 6d. to 2s. |
| Cauliflowers, per dozen | 1s. to 5s. 6d. |
| Beans, per sugar bag | 3s. to 4s. |
| Beetroot, per dozen bunches | 6d. to 9d. |
| Carrots, per dozen bunches | 9d. to 1s. 3d. |
| Chocos, per quarter-case | 1s. 9d. to 2s. 6d. |
| Cucumbers, per dozen | ... |
| Custard Marrows, per dozen | 2s. 6d. to 4s. |
| Vegetable Marrows, per dozen | 2s. 6d. to 4s. |
| Lettuce, per dozen | ... |
| Peas, per sugar bag | 1s. to 2s. 6d. |
| Parsnips, per dozen bunches | 1s. to 1s. 3d. |
| Celery, per dozen bunches | 10d. to 1s. 6d. |
| Sweet Potatoes, per cwt. | 6s. 9d. to 7s. 6d. |
| Table Pumpkins, per cwt. | 7s. 6d. to 8s. |
| Tomatoes, per quarter-case | 2s. to 7s. |
| Turnips, per dozen bunches | 6d. to 9d. |
| Rhubarb, per bundle | 1s. to 1s. 6d. |

## SOUTHERN FRUIT MARKETS.

| Article. | SEPTEMBER. Prices. |
|---|---|
| Bananas (Queensland), per case | 10s. to 12s. |
| Bananas (Fiji), per case | 17s. to 18s. 6d. |
| Bananas (G.M.), per case | 20s. to 23s. |
| Mandarins, per case | 5s. to 7s. |
| Oranges (Navel), per case | 6s. to 8s. |
| Oranges (other), per case | 5s. to 7s. |
| Passion Fruit (Local), per half-case | 2s. to 10s. |
| Lemons, per bushel case | 3s. to 5s. 6d. |
| Papaw Apples, per half-case | ... |
| Pineapples (Queens), per case | 5s. to 7s. 6d. |
| Pineapples (Ripleys), per case | 4s. to 6s. |
| Pineapples (Common), per case | 4s. to 6s. |
| Strawberries (Queensland) per tray | 3s. to 5s. |
| Tomatoes, per quarter-case | 5s. to 9s. |
| Cucumbers, per case | 6s. to 8s. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | SEPTEMBER. Prices. |
|---|---|
| Apples (Tasmanian), per case | 7s. to 10s. |
| Apples (Croftons), per case | 14s. |
| Apples, Cooking, per case | 6s. to 10s. |
| Bananas (Cavendish), per dozen | 2d. to 5d. |
| Bananas (Sugar), per dozen | 1¾d. to 3d. |
| Cape Gooseberries, per quarter-case | 5s. to 7s. 6d. |
| Cocoanuts, per sack | 12s. to 15s. |
| Custard Apples, per quarter-case | 5s. to 8s. |
| Granadillas, per quarter-case | ... |
| Lemons (Lisbon), per case | 5s. to 7s. 6d. |
| Limes (Choice), per quarter-case | 2s. to 3s. 6d. |
| Mandarins, per half-case | 6s. to 8s. |
| Oranges(Navel), per case | 6s. to 8s. |
| Oranges (other), per case | 3s. 6d. to 5s. |
| Papaw Apples, per quarter case | 1s. to 2s. 6d. |
| Papaw Apples (Prime), per quarter-case | 3s. |
| Passion Fruit, per case | 6s. 6d. to 7s. 6d. |
| Peanuts, per pound | 3d. to 4d. |
| Rosellas, per sugar bag | ... |
| Pineapples (Ripley), per dozen | 1s. 9d. to 3s. 6d. |
| Pineapples (Rough), per dozen | 9d. to 1s. 6d. |
| Pineapples (Smooth), per dozen | 1s. 9d. to 3s. 6d. |
| Strawberries, per dozen pint boxes | 3s. 6d. to 7s. |
| Strawberries, per tray | ... |
| Tomatoes, per quarter-case | 2s. to 5s. 6d. |

## TOP PRICES, ENOGGERA YARDS, AUGUST, 1915.

| Animal. | AUGUST. Prices. |
|---|---|
| Bullocks | £31 to £41 5s. |
| Cows | £14 to £16 17s. 6d. |
| Merino Wethers | 54s. 9d. |
| Crossbred Wethers | 63s. |
| Merino Ewes | 46s. 9d. |
| Crossbred Ewes | 50s. |
| Lambs | 44s. 6d. |
| Pigs (Porkers) | 44s. 6d. |

## EXHIBITION PRICES.

| Animal. | AUGUST. Prices. |
|---|---|
| Bullock (Champion) | £46 |
| Bullock (Guessing) | £37 |
| Bullock | £39 |
| Cows (Champion) | £20 5s. |
| Cows | £22 5s. |
| Crossbred Wethers | 81s. |
| Merino Wethers | 55s. 6d. |
| Crossbred Ewes | 54s. |
| Lambs (Crossbreds) | 51s. |

## LONDON QUOTATIONS.

London, 11th September.—Danish butter is quoted at 174s. to 176s. per cwt.

The Liverpool quotation for middling American cotton, September-October shipment, is 5·94½d. per lb.

Jute, September-October shipment from Calcutta, £26 per ton.

Hemp is dull. October-December shipment, £33 per ton.

Mexican Sisal: It is stated in Messrs. Landauer and Co.'s report for 11th August (London) that, owing to a sharp fall in exchange and freight, prices have moved in favour of buyers. Offers have been received for forward shipment at £34 per ton for fair average quality. No business had apparently been concluded, but a small parcel of good quality in store was offering at £36 per ton. From statistics to hand it was to be noted that the shipments of sisal hemp from the Port of Progreso (Mexico) during the month of June reached the record figure of 132,356 bales against 89,208 bales during June, 1914.

Stocks on hand in Progreso, 30th June, 1915 .. .. 81,912 bales.

Stocks on hand in Progreso, 30th June, 1914 .. .. 28,567 bales.

Shipments of sisal this year presumably only reach the United States. The market was quiet for Mauritius hemp, spot values remaining at £33 to £33 10s. for prime, £31 to £31 10s. for good fair, and £30 to £30 10s. for ordinary grades.

Rubber, fine hard Para, 2s. 4⅞d. per lb.; plantation, first latex crepe, 2s. 4d.; smoked sheet, 2s. 4d.

Copra, South Sea, September-October shipment, £22 15s. per ton.

# Orchard Notes for November.

## THE SOUTHERN COAST DISTRICTS.

November is somewhat of an off month for fruit, as the crop of strawberries is about over; pineapples, with the exception of a few off season fruit, are not ready for marketing; and citrus fruits of all sorts, with the exception of those grown in the latest districts, are now over. Bananas should, however, be improving, particularly if the season is favourable.

The most important work of the month is the cultivation of the orchard, as, in order to retain moisture in the soil, it is essential that the soil be kept in a fine state of tilth. Where land is liable to wash, breaks should be left between the fine-worked land, or, even better, a good break of cowpea or other leguminous crop, valuable for producing nitrogen and humus, should be grown. All fruit pests should be attended to; cyaniding can be carried out where necessary, and is especially useful now in the case of the Red, Purple Mussel, Circular Black, and Glover Scales. Fruit-fly should be systematically fought; all infested plums, peaches, guavas, or other fruits should be gathered and destroyed, so as to prevent the spread of the pest. Sucking bugs of all sorts should be gathered and destroyed, the egg-clusters, as well as the immature and mature insects, being destroyed. Hand-gathering is as good a plan as any. Fig beetles should be destroyed by spraying with Kedzie's mixture; and the egg-clusters should be destroyed whenever found.

Bananas and pineapples can be planted during the month, taking care, in the case of the pineapples, not to set out suckers that will immediately throw out a fruit, but those that will become firmly established before they fruit. Examine the vineyard carefully, and keep it well worked. Look out for Oïdium and Black Spot, and treat for same as recommended in the Orchard Notes of the two previous months.

Early ripening grapes will be reaching maturity towards the end of the month; but few, if any, will be ripe. In any case do not market too immature fruit; rather wait a few days longer, till it is fit to eat.

## THE TROPICAL COAST DISTRICTS.

The main crop of pineapples will ripen during the month; and if gathered at the right time—viz., when fully developed, but not turned colour—they will carry all right South, if carefully handled and well packed. Papaws and granadillas are still in season, and will meet with a good Southern demand; they must be packed in cases containing only a single layer of fruit, and should be sent in the cool chamber. I am certain that a good market can be got for these fruits in both Melbourne and Sydney, particularly at this time of the year, when their winter fruits are off and their summer fruits are not yet on.

Watch bananas carefully for fly. Keep the orchards well cultivated.

Only ship good mangoes South; far too much rubbish is sent to Brisbane. Good mangoes will pay to pack properly, but the common sorts, which predominate to an enormous extent, will barely pay freight, if there is a good crop. The canning of good types of fibreless mangoes of good flavour is well worth taking up commercially in the North, as a ready sale for the canned fruits can be obtained.

As in the Southern Coast districts, all fruit pests should be systematically fought, and the orchard should be kept in a good state of tilth, as, once the wet season starts, there is little chance of cleaning up weeds and rubbish of all kinds, or of cultivating and sweetening the soil.

### THE SOUTHERN AND CENTRAL TABLELANDS.

The earlier kinds of summer fruits, such as cherries, will ripen during the month. See that, if fruit-fly makes its appearance, it is systematically fought.

Look out for Codling Moth, and continue the sprayings with Kedzie's mixture.

Look out carefully for any San José scale that may have escaped the winter spraying, as, if the trees are sprayed whilst the young are hatching out, the bulk of the insects are killed and little damage is done either to tree or fruit.

The sulphide of soda spray is one of the best to use now. Keep Woolly Aphis in check, should it make its appearance, using the resin washes; or, if it and San José scale are both present, use the sulphide of soda spray.

Watch the vineyards carefully for Black Spot and Oïdium. Keep the orchard and vineyard well cultivated, so as to retain all the moisture in the soil required for the growth of the tree and development of the fruit. In the warmer parts, irrigate when necessary, following the irrigation by deep and systematic cultivation.

See that grape vines have plenty of foliage to protect the ripening fruit from sun scald, but yet not so dense a foliage as to induce Oïdium or Black Spot. Look out for Red Scale on citrus trees, and cyanide to check same. Look out for fruit-fly in the early ripening fruits, and gather and destroy all that may be so affected.

## Farm and Garden Notes for November.

Field.—Under ordinarily favourable conditions, harvesting the wheat and barley crops may now begin. Those who have oats for hay should cut it when the grain has formed, but before it is ripe, for then the plant is in its most nourishing condition. Destroy caterpillars on tobacco plants, and top the latter so as to throw all the strength into the leaves. Keep down the weeds, which will now try to make headway;

earth up any growing crops requiring the operation; sow maize, imphee, setaria, kafir corn, teosinte, sorghum, &c. Plant sweet potatoes, sisal hemp, yams, peanuts, and ginger.

Kitchen Garden.—Why do so few gardeners and farmers grow their own vegetables? This is a question frequently asked by visitors to the farming districts. The reason probably is, that vegetables require a good deal of care and attention, which means also a good deal of time taken from the ordinary farm work. In many cases it pays the farmer better to buy many kinds of vegetables than to grow them himself. The only vegetables grown on many fine farms are cabbages and pumpkins, not to class potatoes under the head. Many people have an idea that European vegetables cannot be grown during the hot summer months, but this is a great fallacy; the Chinese gardeners supply the town with all kinds of vegetables, except, perhaps, cauliflowers, during the whole of the summer. It is, therefore, clear that, by constant work, plenty of manure, water, and some shade for seedlings, most vegetables can be produced during the hot months from November to March. If your ground has been trenched or deeply dug and well worked, the advantages will be seen during the coming months. It does not pay to work shallow-dug ground. When sowing and planting during this month, give plenty of room between the rows and the plants, otherwise they will be drawn up and worthless, and keep the ground open by constant forking and hoeing. Thin out melon and cucumber plants. It is a good plan to peg down the vines; they will then not be blown about by the wind; they will take root at intervals, and thus help the main stalk. Give plenty of water to tomatoes planted out last month. They should also be mulched. Sow cabbage, French beans, melons, lettuce, radishes, pumpkins, cucumbers, marrows, rosellas, &c.; and transplant for succession in calm cloudy weather.

Flower Garden.—Stake any dahlias which may be now above ground, and plant out the bulbs which were stored in a moist place. If the weaker bulbs are reserved, they will come in for autumn planting. Take up all bulbs which have done flowering, and store them in a dry place. Winter-flowering plants will have gone off almost; still, the garden should be in full bloom, and will well repay the trouble bestowed on it, and a little fertiliser given as a top-dressing will assist the plants to bloom and look well for a longer time than if they were neglected. Give weak liquid manure to chrysanthemums, and allow no suckers to grow till the plants have done flowering. Take up narcissi. Do not store them, but plant them at once in new situations. Sow anthirrhinum, balsam, zinnia, summer chrysanthemum, calliopsis, and nemophila.

Gardens (Vegetable).—Why do so few gardeners and farmers grow their *own vegetables*? This is a question frequently asked by visitors to the farming districts. The reason probably is, that vegetables require a good deal of care and attention, which means also a good deal of time taken from the ordinary farm work. In many cases it pays the farmer better to buy many kinds of vegetables than to grow them himself. The only vegetables grown on many farms are cabbages and pumpkins, not to class potatoes under the head. Many people have an idea that European vegetables cannot be grown during the hot summer months, but this is a great fallacy: the Chinese gardeners supply the town *with* all kinds of vegetables, except, perhaps, cauliflowers, during the whole of the summer. It is, therefore, clear that, by constant *work*, plenty of manure, *water*, and some shade for seedlings, most vegetables can be produced during the hot months from November to March. If your ground has been trenched or deeply dug and well worked, the advantages will be seen during the coming months. It does not pay to work shallow-dug ground. Where sowing and planting during this month, give plenty of room between the rows and the plants, otherwise they will be drawn up and worthless, and keep the ground open by constant forking and hoeing. Thin out melon and cucumber plants. It is a good plan to peg down the vines: they will then not be blown about by the wind: they will take root at intervals, and thus help the main stalk. Give plenty of water to tomatoes planted out last month. They should also be mulched.

beds, marrows, zucchinis, &c.: and transplant for succession in calm cloudy

Flowers (Annuals).—Stake any dahlias which may be now above ground, and plant out the bulbs which were stored in a moist place. If the weaker bulbs are reserved, they will come in for autumn planting. Take up all bulbs which have done flowering, and store them in a dry place. Winter-flowering plants will have gone off almost; still, the garden should be in full bloom, and will well repay the trouble bestowed on it, and a little fertiliser given as a top-dressing will assist the plants to bloom and look well for a longer time than if they were neglected. Give weak liquid manure to chrysanthemums, and allow no suckers to grow till the plant have done flowering. Take up gladioli. Do not store them, but plant them at once in new situations. Sow antirrhinum,

QUEENSLAND AGRICULTURAL JOURNAL

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# Agriculture.

## THE ADVANTAGES AND OBJECTS OF AGRICULTURAL CONFERENCES.

For some years, in the early days of agriculture in the State of Queensland, meetings of agriculturists were held in different centres, notably in East Moreton, under the auspices of the East Moreton Farmers' Association, which may be said to have formed the nucleus of the present splendid National Agricultural and Industrial Association of Queensland. In his introductory speech at the Agricultural Conference at Bundaberg in May, 1891, Mr. Peter McLean, who was at that time Under Secretary for Agriculture, said "that the gatherings of farmers in the past had been evidently more for amusement than for education. The present conference, and others recently held, had for their object the education, not the amusement, of those who took part in them, or who read the proceedings generally published afterwards. The first conference, held at Beenleigh, had been a most gratifying success,

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and the papers read and the discussions thereon had been printed and widely circulated in Queensland and the sister colonies. The department was desirous, by means of these gatherings, to disseminate useful and practical information upon agricultural subjects. This was attained in two ways; first, by opening up a subject by the reading of a paper upon it, but more particularly by the discussion which these papers stimulated. The proceedings would be printed and circulated in the different parts of the colony. The discussions are very often found to be the most important part of the conference. The object of the papers was principally to broach the subject, touching upon the most salient points. It was found at Beenleigh that the discussions elicited more information than was given in the papers read by delegates. Therefore the circulation of the reports of the conferences would do a great deal of good. He (Mr. McLean) had been identified with farming for twenty-seven years, and therefore had some experience of the value of such aid as it was the object of these conferences to offer. There had existed for too long a time an apathy in connection with farming which was dangerous to the industry. The object of the department was to break down this apathy and isolation, and also to bring farmers together to exchange ideas and experiences on the great question of the farming industry. He held that they were just on the fringe of this important question of agriculture. There was no occupation or profession where more intelligence was required than in farming. There was more to be understood, and greater scope for investigation, in agriculture than in any other occupation on which human attention is bent. The Department of Agriculture may do a great deal, and indeed has done something, but unless they could get the sympathy and assistance of the farmers the department could not succeed. These gatherings would break down the apathy and disturb the isolation which, unfortunately, existed amongst farmers. Let them unite, then, and make the conference a success, and compel them to acknowledge that it was good for them to be there.''

It was at this conference that the first mention (as we believe) of dynamite being used in the cultivation of orange-trees was made by Mr. J. Falconer. He called the operation

### Subsoiling with Dynamite.

Once at Moolboolaman he had an orange-tree which was badly blighted. He bored a hole to a depth of 9 inches with an auger disagonally towards the roots, cleaned the hole out, put in a charge of dynamite, fixed the fuse, and exploded the dynamite. The soil was loosened for 20 feet round the tree, and in three weeks the blight had disappeared and the tree became healthy and bore well ever afterwards.

This statement was received with laughter and incredulity, nothing being then known of an operation which, of late years, has been very largely employed in Queensland in subsoiling land amongst growing fruit trees, and in preparing the holes for new plantations. If an Agricultural Conference were held to-day, much valuable information would be given on the beneficial effect of using explosives in the orchard, and there would neither be laughter nor incredulity exhibited.

## COMPLETE FERTILISERS FOR FARM, ORCHARD, AND VEGETABLE GARDEN.

### TOBACCO.

This crop requires a light, sandy loam, containing a large amount of humus. As it is a very exhaustive crop, it must get a liberal supply of artificial fertilisers. The texture, aroma, and burning quality of the leaf is greatly influenced by the fertilisers used, and rank, coarse, organic manures, and also manures containing chlorides, like kainit and muriate of potash, must be avoided.

An artificial fertiliser containing from 4 to 5 per cent. water or citrate soluble phosphoric acid, 5 per cent. of nitrogen, and 8 to 10 per cent. of potash (as sulphate) should be used in quantities from 6 to 10 cwt. per acre, and even such large amounts as 2,000 lb. of this mixture per acre have been found profitable in some of the tobacco countries.

The following fertiliser mixtures may also be used, increasing the amounts on poorer classes of soils:—

(1.) 1 to 2 cwt. superphosphate
1½ to 3 cwt. sulphate of potash
1 to 2 cwt. nitrate of lime or dried blood } per acre;

(2.) 2 to 3 cwt. Thomas phosphate
1½ to 3 cwt. sulphate of potash
1 to 2 cwt. nitrolim or nitrate of soda } per acre;

(3.) 1 to 2 cwt. superphosphate
1½ to 3 cwt. sulphate of potash
2 to 6 cwt. cotton-seed meal } per acre.

### TOMATOES.

Tomatoes are frequently grown by orchardists in their orchards before they come into bearing. The fact that tomatoes are very gross feeders should never be lost sight of, and they undoubtedly impoverish the soil very rapidly, unless artificial fertilisers are supplied to the ground when planting.

Tomatoes do best on rich sandy loam, well drained and subsoiled. Use an artificial fertiliser containing 7 to 10 per cent. phosphoric acid, 8 per cent. potash, and 4 per cent. nitrogen, and apply at the rate of 8 to 10 cwt. per acre, or 8 to 10 lb. per 43 square yards, or 3 to 4 oz. per square yard.

Complete fertilisers can also be made up as follows:—

4 to 5 cwt. superphosphate
1 to 2 cwt. sulphate of potash
1 to 1½ cwt. nitrolim or sulphate of ammonia or nitrate of soda } per acre;

or,

3 cwt. fine bonedust
2 cwt. superphosphate
1½ cwt. sulphate of potash
2 cwt. nitrate of lime or nitrate of soda } per acre,

the nitrate of lime or nitrate of soda to be applied as topdressing in two lots at beginning and during growing seasons.

## TURNIPS.

Turnips, like beets, require a fairly rich, well-worked soil, and the same class of artificial fertiliser.

## WATER MELONS.

Use the fertilisers recommended for cucumbers or for marrows.

## WHEAT.

Wheat may be grown on different classes of soil, and very large areas of country in Queensland are eminently suited for the culture of wheat. A clayey loam, with a fairly porous clayey subsoil, combined with a rather dry climate, gives the best results.

The demand for artificial fertilisers is only moderate, still light dressings with complete manures have given in many localities excellent results. In South Australia, the application of small amounts of superphosphate, ½ cwt. per acre, has increased the yield very considerably.

A complete fertiliser for wheat could be made up as follows:—

½ to 1½ cwt. superphosphate
½ to 1 cwt. sulphate of potash
½ to 1 cwt. nitrate of lime, or nitrolim, or nitrate of soda } per acre,

or a fertiliser containing 7 to 8 per cent. water soluble phosphoric acid, 4 per cent. of potash, and 3 to 4 per cent. of nitrogen, may be used at the rate of 1 to 3 cwt. per acre.

## EGG PLANTS OR EGG FRUITS.

This vegetable is as hardy and easy to grow as the closely allied tomato, and requires a fairly rich sandy loam.

Apply per acre from 8 to 12 cwt. of a fertiliser containing 5 to 7 per cent. soluble phosphoric acid, 4 per cent. nitrogen, and 8 to 9 per cent. of potash, or use the following mixture:—

4 to 6 cwt. of superphosphate
1½ to 2 cwt. of sulphate of potash
1½ to 2 cwt. of nitrolim or sulphate of ammonia or nitrate of soda } per acre;

or the same quantities in pounds to every 43 square yards.

## ORCHARD.

### APPLES.

Apple trees prefer a fairly rich sandy loam, and also do well on the coarse sandy granitic soil of our coastal tablelands, in the Southern portions in which the winter temperature is low enough to give the trees a complete rest during the winter months. Our orchard soils are generally fairly rich in potash, but rather deficient in phosphoric acid, nitrogen, and humus; and mulching of the trees is of utmost importance.

A good fertiliser for apple trees grown on our sandy soils of average quality would be—

1½ lb. bonemeal
1½ lb. superphosphate
1 lb. sulphate of potash
1 lb. nitrolim
} per tree.

This quantity is for young trees; for large trees over eight years old, the quantity can be about doubled.

### APRICOTS.

This fruit tree requires a fairly rich, well-drained, sandy loam, and does very well on our coastal downs country.

A tree in full bearing requires an annual application of—

3 lb. superphosphate
1½ lb. sulphate of potash
1 lb. nitrolim
} per tree.

Young trees can be started with one quarter of this amount, gradually increasing the quantity from year to year until the above amount is reached. For very old big trees, grown on poorer soil, the quantity may be safely increased to 7 or 8 lb. per tree.

### BANANAS.

Bananas require a deep, well-drained scrub soil or rich alluvial loam, in sheltered position, free from frost, near the coast. The soil must contain a large amount of humus. The humus content of the soil must be kept up by mulching with green-manure crop, leaf mould, stable manure, &c.; and any acidity in the soil must be overcome by liming with lime, in form of carbonate of lime, as limestone, shell sand, limestone screenings, &c.

Even on exhausted soil, as long as the soil is in good physical condition and contains humus, bananas may be successfully grown by the aid of artificial fertilisers, applying from 5 lb. to 7 lb. of complete mixed fertiliser to each stool twice a year.

The following manure mixtures will be found beneficial, and will pay the grower by better returns of large bunches:—

Superphosphate, 3 to 4 cwt.
Sulphate of potash, 2 to 3 cwt.
Nitrate of lime or nitrate of soda, 2 to 3 cwt. } per acre;

higher or lower amount according to age and quality of soil;

or,

Superphosphate, 1½ cwt.
Bonemeal, 1½ cwt.
Sulphate of potash, 2 cwt.
Nitrolim or nitrate of soda, 2 cwt. } per acre;

or,

Superphosphate, 3 cwt.
Sulphate of potash, 2 cwt.
Dried blood, 2 cwt. } per acre.

The artificial manure to be applied in two dressings—one towards the end of summer, at the end of rainy season; and the other at the end of winter. Some soils contain a very small amount of salt, and in that case bananas will benefit by a slight dressing of common salt, at the rate of 1 to 2 cwt. per acre.

## CHERRIES.

The successful growth of this fruit is confined to a few localities in this State, as it requires a well-defined cold winter and rather rich, deep, well-drained loam. In suitable localities the use of artificial fertilisers is particularly profitable for this crop, and in accordance with the size of the tree and expected crop the following quantities should be applied per tree:—

2 to 4 lb. of superphosphate;
1 to 2 lb. of sulphate of potash;
1 to 1½ lb. of nitrolim, or sulphate of ammonia;

or,

1 lb. of superphosphate;
2 to 4 lb. bonemeal;
1 to 2 lb. of sulphate of potash;
1 to 2 lb. dried blood;

or,

from 5 to 10 lb. of a mixed fertiliser containing from 6 to 12 per cent. soluble phosphoric acid, 3½ to 4 per cent. of nitrogen, and 5 to 6 per cent. of potash.

## CUSTARD APPLE (Cherimoyer).

This tree is easily grown on most parts of coastal Queensland, or any fair class of soil. Apply, in accordance with the age of the tree:—

1 to 3 lb. superphosphate
2 to 6 lb. meatworks manure (with blood)
1 to 2 lb. sulphate of potash } per tree.

## GRAPES.

Grapes may be successfully grown over a great part of Queensland, extending from the coast to the interior. Any soil, from a light loam to a clayey soil, is suitable, as long as it contains plenty of sand and gravel, and is well drained.

Improved methods of cultivation and the use of artificial fertilisers increases yield and quality of the fruit considerably. Excellent results have been obtained in South Australia with a yearly application of—

1 cwt. superphosphate
¼ cwt. sulphate of potash
¼ cwt. sulphate of ammonia
} per acre;

or applying about 3 oz. of the mixture to each vine.

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## COWPEAS.

The great value of cowpeas as a green manure is well understood in Queensland; and the growing and ploughing-in of this legume are largely practised, especially in the sugar districts. A correspondent of the "Journal of the Jamaica Agricultural Society," understanding that allowing cowpeas to ripen and picking them does not interfere with the nutritive powers of the peas as a green dressing, asked if it would not be a benefit if the peas could be grown and used as food without detriment to the rest of the crops as a green dressing. Following is the reply by the Editor of the above journal—a reply which will be endorsed by all acquainted with this use of the cowpea:—

It surely is obvious that taking away the mature cowpeas, which are the quintessence of the plant, to the extent of 10 to 15 bushels per acre, weighing 60 lb. to the bushel, and which are rich in nitrogen, must take a large proportion of the nitrogen from the soil that the cowpeas were purposely grown to add. If, on the other hand, the cowpeas are cut down when in blossom, or just setting pods, just when the whole powers of the plant are concentrated on making seed, then all the nitrogen, which is the most valuable element, would be added to the soil. The cowpea, in common with other legumes, has the power of absorbing nitrogen from the air; it does not add potash or phosphoric acid to the soil, except that legumes are, as a rule, vigorous growers and deep-rooted, and may utilise stores of potash and phosphorus which more superficially rooted plants would not get at; and thus legumes make these plant foods available for crops, say bananas.

The planter must calculate whether adding so much nitrogen to the soil for the benefit of his bananas or selling his cowpeas will pay him best. He does get benefit in additional humus added to the soil from the dry vines and roots of the cowpeas, together with a modicum of additional nitrogen, no doubt; but all the cowpeas sold off the land

represent so much available fertility lost to his bananas or cocoa or other staple crop.

It has been estimated in the United States that one average acre of cowpeas contains 65 lb. of nitrogen, 111 lb. of potash, and 20 lb. of phosphoric acid; of this the roots and stubble contain 8 lb. of nitrogen, 18 lb. of potash, and 13 lb. of phosphoric acid. A fair crop of 12 bushels of dry peas weighs 720 lb., and of this 18 per cent., or 40 lb., is nitrogen. You get, therefore, 8 lb. of nitrogen in the roots and stubble left, and 17 lb. in vines; and you lose 40 lb. in the peas taken off. You also, however, lose potash and phosphoric acid taken off in the peas—viz., 93 lb. of potash and 7 lb. of phosphoric acid—according to these figures. Adding a fertiliser, especially made up for cowpeas, to the soil when planting the cowpeas would enable a crop of peas to be taken off and still benefit the bananas.

A fertiliser for cowpeas, as laid down in a treatise of the United States Department of Agriculture, should contain about the following proportions:—8 per cent. available phosphoric acid; 6 per cent. actual potash, applied at the rate of 400 to 500 lb. per acre. Nitrogen is not needed for this crop, unless the soil is so very poor that the peas start off with a very weakly and sickly looking growth. This condition would require about 75 lb. of nitrate of soda added to the soil per acre.

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## A USE FOR SEA ISLAND COTTON.

Sea Island cotton finds an important use in the manufacture of motor tyres. The "Times" contains a striking advertisement notifying the fact that the Goodrich Company, Limited, entirely uses Sea Island cotton as the fabric for the foundation of their tyres. It is stated:—

> "There is as much difference between the value of the best cotton and the worst as between cotton and silk. The very finest cotton is the true Sea Island variety. Its quality in length and fineness of staple is extraordinary."

The above advertisement is one of the first that has been noticed in regard to the virtues of Sea Island cotton. The best Sea Island in the world is produced in the Island of St. Vincent, in the West Indies.—"Journal of the Jamaica Agricultural Society."

[With reference to the virtues of Sea Island cotton, there is a cotton grown in North Queensland, evolved some years ago, by Dr. David Thomatis, called "Caravonica." Of this there are three grades —Caravonica Silk, Caravonica Wool, and Kidney-seed Caravonica. The first of these more than possessed the qualities ascribed to Sea Island (of which it is a hybrid), and brought in the European markets a higher price than the latter.—Ed. "Queensland Agricultural Journal."]

## HOW CAN CROPS BE GROWN WITHOUT POTASH MANURE?

The "Journal of the Board of Agriculture" (London) for August, 1915, contains a long and very interesting and instructive article dealing with the above subject, with a view to finding out the best courses to be adopted in the circumstances. It is incidentally mentioned that potash manures are only of recent use in the United Kingdom, and they were not imported in any quantity until about 1890. All the good farming of the sixties was done without them. The crops which most urgently need potash are potatoes, mangolds, and the leguminous crops (clovers, lucerne, vetches, peas, beans, &c.) How, then, is it possible to arrange a supply of potash for them?

Two methods may be adopted:—

(1) Other sources of potash can be used instead of the ordinary Stassfurt salts; and

(2) The supplies of potash in the soil can be made available.

### SOURCES OF POTASH OTHER THAN STASSFURT SALTS.

(*a*) Various Ashes, Etc.—Attempts to utilise various potash minerals which occur in quantity in different parts of the world outside Germany have not materialised. Consequently, none of these can help. Since the war, however, attention has been directed to various sources of supply which are or could be brought immediately within the reach of farmers. These sources are included in Table 1:—

Table 1.—Sources of Potash other than Stassfurt Salts available on the Farm.

| Material. | Percentage of Potash (as $K_2O$).* | Further information is given in :— |
|---|---|---|
| Ashes of seaweed .. .. | 16 | This Journal, Vol. 17, p. 464. |
| Ashes of bracken .. .. | 2·5 | This Journal, Vol. 15, p. 481. |
| Ashes of hedge trimmings .. | 10 | This Journal, Vol. 21, p. 694. |
| Ashes of waste cavings and waste from threshing | 8 to 10 | This Journal, Vol. 21, p. 694. |
| Ashes of wood waste, sawdust, &c. | 5 to 7 | Gimingham, Long Ashton, Rpt., 1914. |
| Fluedust from sawmills .. .. | up to 10 | Gimingham, Long Ashton, Rpt., 1914. |

* Kainit contains 12 per cent. of potash as $K_2O$.

In all these cases except the last the potash is present as carbonate—a very soluble and highly available fertiliser. Its drawback is that it is rather too soluble, so that the ashes have to be kept dry and, above all, carefully shielded from rain, or they may lose half their value in a single night. They can safely be mixed with superphosphate before distribution, and applied at the rate of about 3 cwt. per acre.

Attention having recently been directed in this Journal to most of these substances, it is unnecessary to do more than emphasise once again the urgent necessity of preserving them carefully, and, when practicable, of increasing the supplies by collecting hedge trimmings, prunings, dead bracken, and other waste vegetation for burning and conversion into ash.

Seaweed contains so much potash, and such good fertilising material generally, that we may yet hope to utilise it better than at present.

(*b*) Farm Products.—Farm crops contain considerable proportions of potash, as shown in Table 2. Mangolds easily head the list, a 40-ton crop containing in the roots alone no less than 400 lb. of pure potash, equivalent to 30 cwt. of kainit, while the leaves contain an additional 150 lb. of potash, equivalent to 11 cwt. of kainit. It is evident that the leaves represent a useful source of potash, and should not be wasted; they should be spread evenly on the soil and ploughed-in; decomposition rapidly begins, and the potash is set free. They are relatively free from insect and fungoid pests, and there is little (if any) risk of introducing harmful organisms into the soil to injure the next crop:—

Table 2.—Approximate Potash Content of Various Farm Products.

| Crop or Produce. | Size of Crop per Acre. | Weight of Potash ($K_2O$) Removed per Acre. | Proportion of Potash in the Crop. | Weight of Potash in 1 Ton of Crop. | Approximate Weight necessary to furnish as much Potash as 4 cwt. of Kainit. |
|---|---|---|---|---|---|
| | | Lb. | Per Cent. | Lb. | Tons. |
| Mangolds, roots .. | 40 tons | 400 | 0·45 | 10 | 5½ |
| Mangolds, leaves .. | 15 tons | 150 | 0·45 | 10 | 5½ |
| Turnips, roots .. .. | 20 tons | 110 | 0·25 | 5½ | 10 |
| Potatoes, tubers .. | 8 tons | 108 | 0·6 | 13½ | 4 |
| Clover hay .. .. | 2 tons | 68 | 1·5 | 34 | 1½ |
| Hay from well-manured land* | 2¼ tons | 101 | 2·0 | 45 | 1¼ |
| Hay from unmanured land† | 1 ton | 28 | 1·25 | 28 | 2 |
| Ordinary meadow hay | 1⅓ tons | 54 | 1·6 | 36 | 1½ |
| Oats, grain .. .. | 60 bushels (2,400 lb.) | 12 | 0·5 | 11 | 5 |
| Oats, straw .. .. | 32 cwt. | 36 | 1·0 | 22 | 2½ |
| Wheat, grain .. .. | 40 bushels (2,480 lb.) | 12 | 0·5 | 11 | 5 |
| Wheat, straw .. .. | 36 cwt. | 32 | 0·8 | 18 | 3 |

* Rothamsted Park hay, Plot 16 (mixed mineral manure and nitrate of soda.)

† Rothamsted Park hay, unmanured. Analytical data given in Phil. Trans., 1900, Vol. 192, p. 199.

The potash in these crops is drawn partly from the original stock in the soil, and partly from purchased manures and feeding stuffs. If the crops are sold off the land, the potash is entirely lost to the farm, but more usually the mangolds, turnips, and part of the hay and straw are consumed on the farm. It is interesting to notice that these—the hay and root crops—contain by far the greatest proportion of potash. With the striking exception of potatoes, the crops sold off do not remove much potash, grain in particular taking away relatively very little.

Where the crops are consumed on the farm, a certain proportion of the potash finds its way into the manure, and so back to the land. It

thus keeps circulating between the soil, the crop, the animal, and the manure heap; and we must now inquire what losses arise during the process, and how they may be stopped.

*Potash Retained by Live Stock.*—Potash is less retained by live stock than any other ingredient of manurial value in their food. Lawes and Gilbert, during their famous experiments of 1849-50, found that the increase of weight during fattening was found to contain 1·27 per cent. of nitrogen, 0·86 per cent. of phosphoric acid, but only 0·11 per cent. of potash; in other words, for every hundredweight of flesh laid on, a fattening animal retains only 2 oz. of potash. Milch cows retain more. Milk contains about 0·17 per cent. of potash, so that 100 gallons contain, approximately, 1⅔ lb.

*The Amount of Potash Passing into the Manure.*—About 90 per cent. of the potash present in the animal's food is assimilated and passes into the animal's circulation. The animal does not keep it. What then happens to it? The answer is, that it is excreted in the urine, in which form it is a highly available fertiliser. . . . . The high content of potash is characteristic of urine, and is one of the reasons why especial care should be taken to save it at the present time.

There are three ways in which this can be done:—

(1) By using litter enough to soak it up;

(2) By protecting the manure heap against loss; and

(3) By adopting suitable means for collecting it.

*Losses from the Manure Heap.*—Farmyard manure contains its potash in two forms: the soluble compounds coming from the urine, and the insoluble compounds present in the litter. The sum of the two amounts to about 15 lb. of potash per ton of manure, or rather more than the quantity found in 1 cwt. of kainit or ¼ cwt. of sulphate of potash. The soluble part is liable to considerable loss by washing and drainage unless the heap is adequately protected from heavy rainfall.

At Rothamsted the following losses were found to occur:—

| | Heap Sheltered from Rain; Drainage at a Minimum. | Heap Exposed to Rain; Considerable Drainage. |
|---|---|---|
| | Lb. | Lb. |
| Potash originally present in heap .. .. .. | 147 | 175 |
| Potash left after three months' storage .. .. | 130 | 123 |
| Potash lost .. .. .. .. .. .. | 17 | 52 |
| | Per cent. | Per cent. |
| Potash lost, of total .. .. .. .. .. | 12 | 30 |

The liquid draining away from the heap contains the potash; if it is carefully kept the loss is less serious. Hendrik has recently shown that on an average it contains 0·46 per cent. of potash, or 300 gallons contain about as much as is present in 1 cwt. of kainit, and in an admirable state of availability. Good results were obtained by applying it to grass land.

It appears, then, that the waste of potash on the farm need not be great. The chief points of leakage are the cattle yard and the manure heap, and the chief way in which loss arises is through wastage of the urine and of the brown liquid draining away from the manure. If these sources of loss are stopped, the circulation of potash between the soil, the crop, and the manure heap can be kept up without much loss.

It is now clear why potash did not enter more largely into the scheme of manuring on British farms prior to the more extended cultivation of the potato. A farm worked on the old four-course rotation, and selling only grain and meat, can be made largely self-supporting in the matter of potash supplies if the manure heap is properly managed and the liquid manure is preserved. The bulk of the potash taken up by the cereal crop remains in the straw, and does not pass into the grain: thus, so long as the straw is kept on the farm the supply is only slowly exhausted. Fattening and milking cattle only retain a small part of the potash supplied in the food, even a milch cow only passing some 10 per cent. into its milk; all the remainder goes out in the excretions.

*Methods of Rendering the Potash Reserves in the Soil Available.*—Although potassium fertilisers are easily soluble in water, they do not readily wash out from the soil, because they become absorbed or fixed by some of the soil constituents. Wherever high farming has been practised, and large quantities of potash salts, stable manure, or feeding stuffs have been imported on to the farm, the amount of potash supplies may well have been greater than the amount removed by the crop. A certain accumulation has, therefore, taken place in the soil, forming a reserve which can be drawn upon in the present emergency. The process is essentially one of liquidating capital, and if persisted in for many seasons might have bad effects, but as a war measure no harm need be anticipated.

Two general methods may be adopted:—

(1) Dressings of sodium salts may be applied, such as agricultural salt or sulphate of soda; or

(2) The land may be limed.

Both processes liberate some of the locked-up potash, but they show certain differences that require discussion.

The use of salt or sulphate of soda as a liberator of potash has long been recognised by agricultural chemists. At Rothamsted sodium salts are successfully used on wheat and on mangolds, and analysis shows that they increase the availability of soil potash to the plant:—

TABLE 5.—EFFECT OF SODA IN CAUSING THE LIBERATION OF POTASH FROM THE SOIL (ROTHAMSTED).

| Manurial Treatment. | WHEAT, BROADBALK FIELD, 1852-1871. | | | MANGOLDS, BARNFIELD, 11 YEARS, 1903-1914.* |
|---|---|---|---|---|
| | Yield of Grain per Acre. | Yield of Straw per Acre. | Total Potash taken by Crop in the 20 Years per Acre. | Yield per Acre. |
| | Bushel. | Cwt. | Lb. | Tons. |
| Ammonium Salts only .. | 26 | 23 | 540 | 6·9 |
| Ammonium Salts + Super. | 28 | 26 | 569 | 7·1 |
| Ammonium Salts + Super. + Sulphate of Soda | 34 | 32 | 832 | 23·8 |
| Ammonium Salts + Super. + Sulphate of Potash | 34 | 34 | 1,084 | 23·0 |

* 1908 omitted, as swedes were grown instead of mangolds. Rape cake formed part of the dressing in each case.

We have not space to give the entire text of this most valuable article, but have selected the most salient points which seem to us to be of interest to Queensland agriculturists. The article concludes thus:—

"The continued lack of potash may be met in two ways:—

(1) Greater care must be taken of the sources of potash already available on the farm: wood ashes, damaged straw, mangold and other leaves, liquid manure, &c., which are often allowed to waste in normal times. These contain considerable quantities of potash which, in the aggregate, would help materially in coping with the present shortage. Moreover, the ploughing up of leys and grass land leads to the liberation of the potash stored up in the roots, stems, and leaves, causing it to become available for the next crop.

(2) On most well-managed farms there are supplies of potash in the soil which can now be made available. Two agencies may be adopted:—(*a*) Sodium salts, especially salt and sodium sulphate; and (*b*) lime or chalk. The former can be used for mangolds and for cereals when necessary; lime and chalk are more suitable for leguminous crops (clover, &c.) There might be some risk in using either for potatoes, and growers would probably do best to put all their supplies of potassium salts on this crop.

"Neither lime nor salt actually *supplies* potash, and the method only works where potash is already stored up in sufficient quantity in the soil. On meadow land poor in potash it may prove better to apply liquid manure, as is often done successfully in the north."

## COTTON-GROWING IN AMERICA AND QUEENSLAND.

There is a very erroneous impression amongst some Queensland farmers that cotton is still grown in the United States by black labour. This is not the case. Cotton is grown there, as here in Queensland, by white labour, and farm hands in the States of America are quite as alive

to the "living wage" as are those of this State. It has long ago been shown that cotton can be grown in Queensland to perfection, not only on the coast lands, from South to North, but also in the inland districts far distant from the coast. In times past cotton was grown here on a large scale, and there are to-day, since the failure, owing to the drought of the last few months, of the wheat crop, indications that the drought-resisting cotton will be largely planted during the coming season. In the old days of cotton-growing no account was taken of the seed. This was left to rot in heaps wherever cotton gins were at work. Its value was not realised by either the grower or the ginning owners. By-products, such as linters, hulls, oil, cake, &c., were never taken into consideration.

Now, take the American cotton-seed industry. In twenty-five years the value of cotton-seed in the States has risen from £4,000,000 to £27,000,000, and to-day the cotton fields of the United States have, to a large extent, replaced in their economic system the olive groves of the Mediterranean olive districts. Cotton-seed oil is a good edible product, and cotton-seed oil cake is a valuable cattle food.

# MARKET GARDENING.

## THE PUMPKIN BEETLE.

This pest attacks pumpkins, marrows, melons, and cucumbers, settling and feeding on the leaves in great numbers. They may be to a large extent destroyed by hand-picking in the early morning. When quite young the plants may be protected by a covering of hessian, but as they rapidly grow and send forth runners, something else must be resorted to to keep down their numbers. It has been noticed that, although endowed with a ferocious appetite, the beetle (Banded Galerca) declines to consume foliage which has become soiled. Accordingly the plants may be more or less protected by dusting upon them fine wood ashes and air-slaked lime, with a little kerosene or carbolic acid sprinkled on. For poisoning, treat the plants with Paris green applied in the form of a fine spray, not exceeding 1 lb. to 160 gallons of water. This must be kept well stirred when in use, and should not be applied during rain, sunshine, or heavy drying winds, nor within a month of the time of gathering. Another good spray is made of white arsenic, 1 lb.; unslacked lime, 2 lb.; water, 3 gallons. Slowly slack the lime, add the arsenic, put in the water, and boil for an hour. Add 160 gallons of water, and it is ready for use. Where practicable, as in a small market garden, shake the beetles into a bucket containing a little kerosene or boiling water. Where they are feeding in great numbers, this would be a simple way of destroying considerable numbers, and be taking advantage of the habit this species has of feeding in company, and suddenly dropping off the leaves when alarmed.

# Pastoral.

## SHEEP ON THE DAWSON VALLEY COUNTRY.

Mr. W. G. Brown, Instructor in the Sheep and Wool Industry, Department of Agriculture and Stock, replying to a series of questions by an intending sheep-farmer at Deeford, says:—

I have no doubt whatever that sheep would do well on your country, especially the crossbred (say, Border-Leicester on Merino). I will answer your questions seriatim.

(1) Merino sheep on cultivation or artificial grasses will do well, but crossbreds will do very much better, as they are hardier in every way, and can stand up better against internal parasites than Merinos.

(2) The only diseases to fight in that district are parasitic, (*a*) stomach worms (*Strongylus contortus*), (*b*) nodule worms (*Oesophagastoma Columbianum*), (*c*) blow-fly pest. The cure is simple, and instruction will be given by an officer of this Department should it be desired.

(3) Rhodes grass is eminently suitable for sheep, and this matter, from information at my disposal, has gone past the experimental stage. Sheep, however, prefer a short bite, hence it is better that the Rhodes should not be too rank or coarse.

(4 and 5) Border-Leicester or Romney-Marsh on good plain-bodied Merino ewes. Good crossbred ewes are very scarce and expensive, but a Lincoln-Merino is an ideal first cross.

(6) The silage mentioned (a mixture of Rhodes grass, millet, maize, sorghum, and peas) forms a very high-class fodder, and sheep will eat it readily. A ewe suckling a lamb will keep in good condition on 4 lb. a day. If there is other rough feed, 2 lb. would suffice.

(7) I do not consider Prairie a high-class sheep feed. It cannot stand a dry spell as can Rhodes.

(8) A good stand of Rhodes grass will keep sheep in good condition at the rate of, at least, six sheep per acre.

## ERADICATION OF THISTLES.

Although no efficacious remedy for exterminating Scotch Thistles is known, it may be of interest to note that in some parts of Queensland, where the pest has appeared, it practically was choked out by reason of the fact that when the weeds were in such excess quantities the immediately available supplies of moisture and plant-food were exhausted. The land also became "thistle-sick" from the exudation of toxins from the roots. In ordinary seasons the Rhodes Grass is able to exercise its well-known smothering tendencies, but where the thistles are well advanced, any other quick-growing grass, or seeds sown for a particular purpose and to get a "burn," would be equally impracticable.

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF SEPTEMBER, 1915.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Gretchen ... | Holstein ... ... | 16 Aug., 1915 | 1,179 | 3·4 | 46·85 | |
| Davidina ... | Ayrshire ... ... | 21 Aug. ,, | 819 | 3·9 | 37·47 | |
| Sylvia II. ... | Shorthorn... ... | 25 Aug. ,, | 869 | 3·6 | 36·61 | |
| Lennie ... | Ayrshire ... ... | 23 July ,, | 823 | 3·7 | 35 85 | |
| Bluebelle ... | Jersey ... ... | 20 June ,, | 653 | 4·2 | 32·22 | |
| Lilia ... | Ayrshire ... ... | 19 Aug. ,, | 734 | 3 6 | 30·96 | |
| Noble Dot ... | Jersey ... ... | 2 May ,, | 499 | 5·1 | 30·06 | |
| Iron Plate ... | ,, ... ... | 21 Feb. ,, | 509 | 5·0 | 30·04 | |
| Lady Dorset | Ayrshire ... ... | 10 Aug. ,, | 600 | 4·0 | 28·17 | |
| Silver Nell... | Shorthorn ... | 13 Aug. ,, | 669 | 3·4 | 26 58 | |
| Miss Bell ... | Jersey ... ... | 2 July ,, | 518 | 4·2 | 25·58 | |
| Lady Twylish | ,, ... ... | 5 June ,, | 475 | 4·5 | 25 17 | |
| Rosine ... | Ayrshire ... ... | 7 Aug. ,, | 607 | 3·4 | 24·21 | |
| Lady May ... | ,, ... ... | 7 Mar. ,, | 499 | 4·0 | 23·45 | |
| Miss Lark ... | ,, ... ... | 8 Sept. ,, | 587 | 3·3 | 22·62 | |
| Netherton Belle | ,, ... ... | 23 April ,, | 449 | 4·2 | 22·15 | |
| Lady Athol | Shorthorn... ... | 29 May ,, | 529 | 3·5 | 21·66 | |
| Lady Melba | Holstein ... ... | 6 Mar., 1914 | 437 | 4·1 | 21·05 | |
| Auntie's Lass | Ayrshire ... ... | 16 Feb., 1915 | 397 | 4·5 | 21 04 | |
| Lady's Maid | Shorthorn ... | 2 Feb. ,, | 349 | 5 0 | 20·60 | |
| Princess Kate | Ayrshire ... ... | 9 July ,, | 440 | 3·9 | 20·13 | |

Fed on natural pastures, supplemented by daily ration of 35 lb. of panicum ensilage per head.

## COMMENT UPON HERD-TESTING OPERATIONS.

BY E. GRAHAM, Dairy Expert.

During the year, herd-testing operations were conducted by the Herd-testing Officer (Mr. L. Andersen) in numerous districts throughout the State, and the particular localities comprised were:—Wellcamp, Cambooya, Greenmount, Swan Creek, Jondowae, North Arm, Yandina, Eumundi, Kenilworth, Goomboorian, Goondoon, Mount Larcomb, Gogango, Bushley, The Caves, Woowoonga, Byrnestown, Coulstoun Lakes, Goomeri, and Atherton Tableland.

It will be noticed that the activities of the Herd Tester extended over a considerable portion of the area utilised for dairying purposes, but there remain some important dairying centres which hold aloof from the adoption of systematic herd-testing. The principal inquiry for the services of the Herd Tester came from those who have recently entered into dairying as a means of livelihood; and the desire manifested by the later converts to dairying towards effecting an improvement in the quantity and quality of the milk yields of their dairy herds augurs well for the future of the industry, and shows plainly that in this particular at least numbers of the younger generation are fully appre-

hensive of the necessity to engage in their herds only animals capable of yielding milk in profitable quantities.

Under existing circumstances, with specially high prices offering for either fat or store conditioned stock, the "lodger" cow is not to be tolerated within the dairy herds; and the result of herd-testing positively indicates that every herd contains animals which do not produce butter fat in sufficient quantity to reimburse the owner for the cost of their agistment and the expense involved in the drawing of the milk.

In order to meet the full force of the opposition levelled at the industry in this State by competitors within other countries actively engaged in the production of dairy products, it is essential that no delay should occur in the eradication of all low-yielding and unprofitable milch cows from the herds. At the present time we find returns showing that in several rival countries the number of pounds of commercial butter produced on the average by the milch cows utilised exceeds the average number of gallons of milk yielded by the dairy cows of this State.

Estimating that it ordinarily requires at least 2¼ gallons of herd milk to produce 1 lb. of commercial butter, it is not a difficult matter to form an opinion as to which set of competitors is to hold supremacy until such time as the disparity in the productiveness of the respective herds is reduced considerably. The actual testing of a few herds in each district, although beneficial, will not lead to a rapid increase in the general standard of productiveness of the whole of the dairy herds of this State. The number of cows utilised for dairying purposes is far too great to be appreciably affected by the results of herd-testing operations conducted upon a limited scale. Queensland is credited with containing more than 380,000 dairy cows, and during the last year the animals submitted to the Herd Tester did not total 5,000 in number. The cows tested represented less than 2 per cent. of the animals employed for the purpose of dairying. Surely it is high time the owners of the remaining 98 per cent. of milch cows set out to determine the actual profit-earning capability of the individual cows within their herds.

In order to encourage a general submission of the dairy herds to systematic butter-fat testings, the Department of Agriculture long ago provided the machinery necessary for the performance of the work involved in the actual testing of the milk. Consequently the dairy farmers are solely responsible for the restriction in the number of cows tendered for testing purposes, as they are, as owners, privileged to either submit or withhold their herds from the application of the test. However, the existing mark-time attitude and apathy shown to herd-testing should be promptly abandoned by dairy farmers and favour shown to a policy more in keeping with modern teachings. No material progress is possible, or is a full measure of the benefits of herd-testing to be enjoyed, until the dairy herds are subjected to the scrutiny of the Herd Tester in numbers more in keeping with the full complement of the cows utilised for the purpose of dairying.

It must ever remain that a highly productive dairy herd is the king-pin of success in dairy farming.

Appended is a summary of the herd-testing operations for the year:—

Number of cows submitted for the purpose of testing .. 4,310

Daily average yield of milk per cow in the tested herds:—

| | |
|---|---|
| Mean | 14·3 lb. |
| Highest | 25·7 lb. |
| Lowest | 1·8 lb. |

Daily average butter fat content of herd milk:—

| | |
|---|---|
| Mean | 4·1 per cent. |
| Highest | 5·9 per cent. |
| Lowest | 3·0 per cent. |

Daily amount of commercial butter produced per cow:—

| | |
|---|---|
| Mean | 0·68 lb. commercial butter. |
| Highest | 1·23 lb. commercial butter. |
| Lowest | 0·11 lb. commercial butter. |

The result of an analysis of the behaviour of the individual cows comprised within the dairy herds, when submitted to a Babcock test by the Herd Tester, indicates that it is unnecessary to cite hypothetical cases for the purpose of illustrating the great variance existing in the relative quantities of butter fat produced by individual animals, and the influence this factor is capable of exerting over the amount of profit to be won from the dairy farm. The specific test results of several dairy herds, herein quoted, provide convincing evidence in this direction.

As an example, we shall first take Dairy Herd K. This herd comprised 15 cows.

A summary of the record made by these animals, when subjected to a butter-fat test, carried out under identical conditions, as far as treatment, access to pasture, &c., are concerned, is as follows: —

Animal A, 27 days in milk, produced 1·52 lb. of commercial butter in 24 hours.

Animal B, 28 days in milk, produced ·60 lb. of commercial butter in 24 hours.

At the above rate of production Animal A, in a lactation period of 300 days, would produce equivalent to 456 lb. of commercial butter; while A's companion B, in the same time, would produce equivalent to 180 lb. of commercial butter, leaving a difference of 276 lb. of commercial butter in favour of A.

Within the same period (300 days), the five foremost cows of this herd, collectively, produced—

1,410 lb. of commercial butter.

The five cows next in merit as producers of butter fat yielded, collectively—

1,100 lb. of commercial butter.

The five cows within the herd yielding least butter fat were capable only of producing, collectively—

885 lb. of commercial butter.

Taking the value of commercial butter at 1s. per lb., we find that the commercial butter production of the respective groups of cows has the following values:

| | £ | s. | d. |
|---|---|---|---|
| 5 foremost cows within the herd yield 1,410 lb. of commercial butter at 1s. per lb, equal to .. .. | 70 | 10 | 0 |
| 5 cows next in merit yield 1,100 lb. of commercial butter at 1s. per lb., equal to .. .. .. | 55 | 0 | 0 |
| 5 cows (lowest producers) yield 885 lb. of commercial butter at 1s. per lb., equal to .. .. .. | 44 | 5 | 0 |

15 being the total number of cows contained in the herd.

For the purpose of estimating the net profit accruing from the several group associations made of the milch cows contained in this particular herd, let us assume that the entire cost of maintaining or attending a dairy cow is £6 per annum. We then get the following figures:—

| | Sales of Com. Butter. | | | | Cost of Maintenance. | | | | Net Profits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | £ | s. | d. | | £ | s. | d. | | £ | s. | d. |
| 5 foremost cows—gross receipts | 70 | 10 | 0 | less | 30 | 0 | 0 | .. | 40 | 10 | 0 |
| 5 cows next in merit—gross receipts .. .. .. | 55 | 0 | 0 | less | 30 | 0 | 0 | .. | 25 | 0 | 0 |
| 5 cows (lowest producers)—gross receipts .. .. | 44 | 5 | 0 | less | 30 | 0 | 0 | .. | 14 | 5 | 0 |

In reviewing the relative amounts of net profits, it is found that the five foremost cows are almost threefold as profitable as the five lowest producers in the herd.

Another point to be emphasised, and one which is frequently overlooked by those actively engaged in dairying, is that it is not necessary for an animal to produce three times as much butter fat as another in order to establish a threefold supremacy in profit earning. A comparison between the quantities of commercial butter above shown clearly indicates this, as, in volume, the amounts of commercial butter stand in the proportion of 1,410 to 885 or as 1·6 is to 1.

*Example No. 2.*

Actual test results connected with the testing of two cows comprised in Herd L are employed for the purpose of demonstrating the influence the percentage of butter fat in milk is capable of exercising over the quantity of commercial butter derivable from milk.

A comparison is made between the production of commercial butter by a cow giving milk of moderately high test with that of an animal yielding milk of a low percentage of fat; the milk yield in each case being very similar in quantity. The particulars are as follow:—

Both cows were 30 days in milk when testing operations were commenced.

Cow F yields an average of 23 lb. of milk, testing 2·6 per cent. of butter fat per day.

Cow G yields an average of 26 lb. of milk, testing 4·1 per cent. of butter fat per day.

In a lactation of 300 days the Cow G yields only 90 gallons of milk more than the Animal F; but the quantity of commercial butter produced by the former is 168 lb. in excess of that produced by the low testing Cow F.

*Example No.* 3.

In this instance the adoption of systematic herd-testing revealed the wide disparity which occurs in the relative productiveness of individual cows contained within the dairy herd. Such cases are not by any means unique, but are to be met with in almost every herd which has not been submitted to the scrutiny of a test.

The actual test records of two cows both fresh at their work, as quoted, are the results of testing operations conducted in Herd M:—

Cow H yielded daily average of 12 lb. of milk, testing 3·1 per cent. of butter fat for a period of 300 days.

Cow J yielded daily average of 28¾ lb. of milk, testing 4·1 per cent. of butter fat for a period of 300 days.

In the period taken—

Cow H produced 129 lb. of commercial butter, which, at 1s. per lb., equals £6 9s.;

Cow J produced 411 lb. of commercial butter, which, at 1s. per lb., equals £20 11s.;

leaving a difference of £14 2s. per annum in the gross earnings of the respective animals.

Assuming that the assessment of cost of maintaining and attending a milch cow is rightly estimated at £6 per year, it is evident that the Cow H is not a profitable animal to retain in the dairy herd.

In actual practice herd-testing has been the means of bringing to light innumerable animals incapable of producing butter fat in sufficient quantity to repay the owner for the cost of sustenance and attention involved in their maintenance; and the removal of animals found unprofitable for dairy purposes has been necessary in almost every herd tested. In some instances the percentage of animals necessarily to be culled from the herds has been comparatively small, being as low as 3 per cent. of the entire herd; but in other cases the eradication of as high as 56 per cent. of the cows has been necessary, in order to place the dairy herd upon a remunerative footing in so far as production of butter fat is concerned.

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## PRICKLY-PEAR AS A FODDER.

On this subject, Mr. R. O'Sullivan writes:—

"*Re* the above, I have pleasure in relating my experience, which, although only on a small scale, will prove that the prickly-pear is excellent for feeding cattle, and has the additional merit of being cheap. In the beginning of the big drought of 1902-3 I was living at Corinda, and a friend of mine, who is a surveyor in the Railway Department, suggested that we try prickly-pear for feeding our cows. I agreed, and

we got two of the local men to join in with us. We got a truckload of pear, as we wanted it, by rail from Nudgee, and divided it between us. To feed my cow, the course I adopted was as follows:—I put as much pear as I could cram into a kerosene tin, and then filled the tin with water. I then put the tin on the stove, and, after allowing the water to simmer for a couple of hours, I poured the liquid into another kerosene tin which contained about a quart of bran and one-third of the tin of lucerne chaff. Next morning I gave this to my cow, with the leaves, which were boiled; and although I experienced some trouble in inducing my cow to taste it, still, once she did so, she ate it afterwards most willingly. When I first started I used to cut off the big spikes, but I found that after being boiled they were quite soft. After that I boiled the spikes and all. I gave a similar feed every evening. My share of the pear lasted me over a month, and I am certain it did not cost me 10s. for the pear I used. I particularly noticed that, although I doubled the quantity of lucerne, when I ran out of the pear, if I had to wait a week or so for the fresh supply, my cow fell away in the milk, and came up again when I returned to the pear. A gentleman, whom I casually met in the train, informed me that he was feeding quite a number of cows on prickly-pear, boiled, but as he believed it would form a ball in the stomach he intended selling them when the drought was over. With regard to the 'ball in the stomach' theory, I am quite satisfied there is nothing in it, as I kept that cow for years afterwards, and I am certain it would have been hard to have found a healthier animal.

"I advised a well-known Sandgate milkman, who had the pear growing up against his fence, to try my method of using the pear, and he told me afterwards he found it good. I may say that this man thought he would improve on my way, and also save water by putting it through the chaffcutter, but he found his idea not feasible, as the pear, being greasy, clogged his machine. It often occurred to me, when I noticed the excessive—in fact, almost prohibitive—price of lucerne chaff, to publish in the Press my experience, but I refrained from doing so, as I dislike publicity; however, at a time like the present, I consider it is the duty of everyone to publish any information which may be useful."

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## SUDAN GRASS FOR PIGS.

Sudan grass has been most successfully grown at the Queensland Agricultural College. As a pasture grass it is highly recommended, especially as a pasture for pigs. It has been reported from the State of Kansas, U.S.A., that pigs were turned into a field partly sown with Sudan Grass and partly with Rape. It was naturally expected that the pigs would prefer the Rape, but, on the contrary, they left the Rape, and ate down the Sudan Grass, to the point of killing it out. This is good enough for Queensland farmers. Roots of Sudan or seed can be obtained from the Q.A. College; seeds at 4s. per lb., in small quantities, not exceeding 2 lb. to any one purchaser.

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, SEPTEMBER, 1915.

Seven thousand five hundred eggs were laid during the month—an average of over 141 per pen. C. E. Bertelsmeier's White Leghorns win the monthly prize with 161 eggs. The following are the individual records:—

| Competitors. | Breed. | Sept. | Total. |
|---|---|---|---|
| Jas. McKay | White Leghorns | 132 | 778 |
| Mrs. J. Jobling, N.S.W. | Black Orpingtons | 124 | 764 |
| J. Gosley | White Leghorns | 150 | 744 |
| Mrs. Munro | Do. | 146 | 740 |
| C. E. Bertelsmeier, S.A. | Do. | 161 | 736 |
| J. D. Nicholson, N.S.W. | Do. | 147 | 720 |
| S. E. Sharpe | Do. | 148 | 715 |
| J. M. Manson | Black Orpingtons | 150 | 715 |
| A. W. Bailey | White Leghorns | 145 | 712 |
| Kelvin Poultry Farm | Do. | 149 | 708 |
| J. R. Wilson | Do. | 135 | 700 |
| E. F. Dennis | Do. | 155 | 698 |
| A. H. Padman, S.A. | Do. | 154 | 696 |
| King and Watson, N.S.W. | Do. | 140 | 690 |
| C. T. Clark | Do. | 141 | 671 |
| T. Fanning | Black Orpingtons | 147 | 668 |
| E. Le Breton | White Leghorns | 142 | 667 |
| J. M. Manson | Do. | 153 | 663 |
| A. T. Coomber | Do. | 145 | 664 |
| H. Hammill, N.S.W. | Do. | 136 | 661 |
| O.K. Poultry Yards | Do. | 151 | 654 |
| E. V. Bennett, S.A. | Do. | 139 | 649 |
| C. Knoblauch | Do. | 148 | 647 |
| E. A. Smith | Do. | 150 | 647 |
| R. Burns | Black Orpingtons | 137 | 642 |
| T. Fanning | White Leghorns | 130 | 640 |
| W. Purvis, S.A. | Do. | 152 | 637 |
| W. Parker | Do. | 151 | 633 |
| W. Meneely | Black Orpingtons | 131 | 633 |
| G. Tomlinson | White Leghorns | 140 | 632 |
| F. Clayton, N.S.W. | Do. | 140 | 628 |
| R. Jobling, N.S.W. | Do. | 130 | 626 |
| Cowan Bros., N.S.W. | Do. | 137 | 622 |
| R. Burns | S. L. Wyandottes | 138 | 617 |
| R. Jobling, N.S.W. | Do. | 121 | 616 |
| Moritz Bros., S.A. | White Leghorns | 142 | 614 |
| Cowan Bros., N.S.W. | Black Orpingtons | 134 | 611 |
| Derrylin Poultry Farm | White Leghorns | 133 | 607 |
| W. Lindus, N.S.W. | Do. | 147 | 604 |
| W. Lyell | Do. | 137 | 600 |
| E. A. Smith | Black Orpingtons | 152 | 585 |
| G. H. Turner | White Leghorns | 142 | 574 |
| J. Zahl | Do. (No. 1) | 145 | 572 |
| J. Aitchison | Do. | 127 | 569 |
| J. G. Richter | Do. | 144 | 563 |
| J. Zahl | Do. (No. 2) | 125 | 556 |
| J. H. Gill, Victoria | Do. | 155 | 549 |

| Competitors. | Breed. | Sept. | Total. |
|---|---|---|---|
| Loloma Poultry Farm, N.S.W. ... | Rhode Island Reds ... | 146 | 540 |
| E. Pocock ... ... ... ... ... | White Leghorns ... | 144 | 524 |
| F. Clayton, N.S.W. ... ... ... | Rhode Island Reds ... | 140 | 461 |
| S. Chapman ... ... ... ... | Brown Leghorns ... | 130 | 458 |
| W. H. Forsyth, N.S.W. ... ... | White Leghorns ... | 141 | 434 |
| J. R. Johnstone ... ... ... ... | Plymouth Rocks ... | 121 | 317 |
| Totals ... ... ... ... | ... | 7,500 | 33,371 |

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF SEPTEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING SEPTEMBER, 1915 AND 1914, FOR COMPARISON.

| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | | Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|---|---|---|---|---|
| | Sept. | No. of Years' Records. | Sept., 1915. | Sept., 1914. | | Sept. | No. of Years' Records. | Sept., 1915. | Sept., 1914. |
| *North Coast.* | In. | | In. | In. | *South Coast*—continued: | In. | | In. | In. |
| Atherton ... ... | 0·46 | 13 | Nil | 2·15 | | | | | |
| Cairns ... ... | 1·04 | 27 | Nil | 1·75 | Nanango ... ... | 1·96 | 27 | 2·43 | 0·15 |
| Cardwell ... ... | 1·32 | 27 | 0·10 | 0·73 | Rockhampton ... | 1·34 | 27 | 2·33 | 0·54 |
| Cooktown ... ... | 0·57 | 27 | 0·04 | 1·25 | Woodford ... ... | 2·14 | 27 | 2·71 | 0·82 |
| Herberton ... ... | 0·44 | 27 | 0·04 | 1·50 | Yandina ... ... | 2·14 | 21 | 2.68 | 1·23 |
| Ingham ... ... | 1·16 | 22 | 0·24 | 0·47 | | | | | |
| Innisfail ... ... | 3·03 | 27 | Nil | 8·75 | | | | | |
| Mossman ... ... | 0·79 | 5 | Nil | 1·85 | *Darling Downs.* | | | | |
| Townsville ... ... | 1·30 | 30 | 0·06 | Nil | | | | | |
| | | | | | Dalby ... ... | 1·79 | 27 | 1·55 | 0·38 |
| *Central Coast.* | | | | | Emu Vale ... ... | 1·86 | 17 | 0·67 | 0·45 |
| | | | | | Jimbour ... ... | 1·75 | 24 | 1·20 | Nil |
| Ayr ... ... ... | 1·90 | 27 | 0·48 | 0·04 | Miles ... ... | 1·43 | 27 | 0·93 | 0·50 |
| Bowen ... ... | 1·15 | 27 | 0·01 | 0·23 | Stanthorpe ... | 2·23 | 27 | 1·81 | 1·04 |
| Charters Towers ... | 0·84 | 27 | 0·47 | 0·18 | Toowoomba ... | 2·13 | 27 | 0·83 | 0·41 |
| Mackay ... ... | 1·75 | 27 | 0·20 | 0·92 | Warwick ... ... | 1·98 | 27 | 0·61 | 0·34 |
| Proserpine ... ... | 2·21 | 11 | 0·01 | 3·60 | | | | | |
| St. Lawrence ... | 1·29 | 27 | 1·71 | 0·85 | | | | | |
| | | | | | *Maranoa.* | | | | |
| *South Coast.* | | | | | | | | | |
| | | | | | Roma ... ... | 1·49 | 25 | 0·67 | 0·31 |
| Biggenden ... ... | 1·48 | 14 | 2·65 | 0·73 | | | | | |
| Bundaberg ... ... | 1·81 | 27 | 0·28 | 0·84 | *State Farms, &c.* | | | | |
| Brisbane ... ... | 2·03 | 64 | 1·57 | 0·82 | | | | | |
| Childers ... ... | 1·95 | 19 | 3·28 | 1·31 | Gatton College ... | 1·66 | 14 | 1·12 | 0·48 |
| Crohamhurst ... | 2·24 | 22 | 4·93 | 2·26 | Gindie ... ... | 0·95 | 13 | 1·07 | Nil |
| Esk ... ... ... | 2·30 | 27 | 2·36 | 0·96 | Kamerunga Nurs'y | 1·13 | 23 | Nil | 3·44 |
| Gayndah ... ... | 1·63 | 27 | 1·04 | 0·78 | Kairi ... ... | ... | ... | Nil | 1·86 |
| Gympie ... ... | 2·22 | 27 | 3·18 | 1·46 | Sugar Experiment Station, Mackay | 1·63 | 16 | 0·53 | 1·68 |
| Glasshouse M'tains | 1·56 | 6 | 2·76 | 1·59 | Bungeworgorai ... | 0·77 | 3 | 0·91 | 0·58 |
| Kilkivan ... ... | 1·77 | 27 | 0·79 | Nil | Warren ... ... | 0·14 | 3 | 0·08 | Nil |
| Maryborough ... | 1·78 | 27 | 2·94 | 2·35 | Hermitage ... | 1·56 | 7 | 0·73 | 0 33 |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals or September this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

# State Farms.

## STATE FARM, BUNGEWORGORAI.

The Manager furnishes the following report on the institution for the month of October:—

*Meteorological.*—Since submitting the previous report 61 points of rain have been recorded, but the benefit derived therefrom was of little consequence owing to the subsequent hot weather and strong drying winds. This month's record brings the rainfall for 1915 to a total of 504 points.

*Winter cereals.*—These crops are curing off, due to the fact that there is not sufficient moisture in the soil to meet the plant's requirements. Even with exceptionally favourable conditions prevailing from now on the yield will be extremely light and the grain of poor quality.

Harvesting operations should be commenced within the next fortnight.

*Summer crops.*—The crops mentioned as having been sown in last report germinated well, but are now in a precarious condition.

During the period under review another 10 acres have been sown with cow-peas and sorghums, bringing the total under summer crops to 29 acres.

*Vineyard.*—Splendid growth has been made in this section and the majority of the varieties give indications of heavy yields under congenial conditions.

*Orchard.*—Citrus: These trees are again exhibiting unmistakable signs of distress, and the prospects of this season's crop are anything but good. Deciduous: The apricots, so far as fruit is concerned, are a complete failure, but they are with one or two exceptions in a flourishing condition. The same remarks apply to the plums and other deciduous fruits.

*Grasses.*—Teff grass: The 7 acres sown with this grass is now tinged with green, a good germination having taken place. For this block alone it is hoped that rain will be experienced very shortly, so that the plants' behaviour on clayey and sandy soils under field conditions can be ascertained. Rhodes grass: This is again showing signs of the continued dry spell.

*Miscellaneous sowings.*—The crossbred cow-peas have been sown and a good germination was obtained, but owing to the depredations of the cut and wire worm, practically the whole of the plants have been destroyed.

*Potatoes.*—Three (3) drills of this tuber have been planted and are now above ground.

*Cucurbitaceæ.*—Small sowings have been made of water-melons, rock melons, and pumpkins.

*Stock.*—The horses look exceptionally well considering, and the cattle appear to be holding their own, with the exception of the cows, which have recently calved, these having fallen away a little.

# The Orchard.

## THE FIJI BANANA TRADE.

(From the "Fiji Planters' Journal.")

Our banana-growers have frequently been threatened with disaster in various forms. There have been floods and hurricanes, Queensland growers and Australian taxation—not to mention increased freights, Government inspection, and incomprehensibly small returns by account sales when the Australian market seemed otherwise normal.

Recently another shadow has risen upon the Fijian banana-planters' horizon which bids fair to develop serious proportions. We refer to the Tweed River banana trade. There is no doubt whatever that bananas of excellent flavour and sufficient size to hold their own against the Fiji-grown fruit are now being shipped by the Tweed River planters; and this fruit has the additional advantage of cheaper freight, no duty, and can reach the market 24 hours instead of 9 to 10 days after cutting.

With these facts before them, there is no doubt the Fiji banana-planters will see the necessity for looking to their laurels speedily, or they will be ousted from the field.

The age of competition has passed, and commercial concerns all the world over are succeeding or failing to succeed by their power of co-operation.

If the Fiji banana trade is to continue, there must be some co-operative effort on the part of our planters to handle their fruit to the best possible advantage, and stop all the present leakages by which thousands of pounds, which should go directly into the growers' pockets, are being diverted into other channels or absolutely lost.

Anyone who knows the Sydney banana market will admit that the best banana purchasable to-day is an inferior article compared to the best banana of ten years ago. This is, without doubt, due to the fact that in their effort to avoid loss by over-ripeness growers are cutting fruit in a less mature state than was the custom prior to inspection days.

This may be altered by having carrying facilities of a kind that can assure the delivery of the fruit in Sydney in exactly the same condition in which it is received by the carriers in Fiji. There is nothing Utopian about the suggestion. It is done all the world over, and argument as to possibility and advantage is superfluous.

Additional attention must be given to the packing of the best grade of fruits, in order that it may be delivered to the purchaser with the least possible handling. There is always a market for a limited supply of the finest fruit that can be grown at the very topnotch price. A price can be obtained in Australia for selected bunches of bananas carefully

packed in cases in Fiji, which will more than repay for the additional expense.

The present system of consigning to many small agents in Sydney, with absolutely no supreme supervision on the spot, is extremely foolish and alarmingly wasteful.

Bananas are piled out on the Sydney wharf with classification as to brand only, and there sold. . . .

Fruit graded according to quality, repacked for sale and country orders, and, where immature, placed in a warm room for ripening, would bring very considerably better returns than the same fruit sold in broken heaps even by auction.

Queensland fruit-growers now consign all their Sydney shipments to one man, who, while selling none himself, supplies the wholesale dealers with the quantities that in his opinion they can handle to advantage. In this way, if account sales on one shipment from a certain agent are without reason unsatisfactory, the Sydney manager is able to refuse to supply that agent with further fruit. The result is claimed to be most satisfactory to the Queensland growers.

An alternative scheme could be the opening up of a banana market in Sydney by the Fiji growers, where all fruit could be received, graded, repacked, &c., and sold by auction. Such market to be, of course, in the hands of a man whose continued employment depends upon his satisfactory returns, and who could be dismissed for failure to obtain the best possible results for his employers.

There may be other practical methods suggested; but, whatever scheme should be decided upon, to insure success it must be, as we have stated, a scheme of co-operative handling as against the present competitive sales.

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## BANANA MANURING.

By R. G. BARTLETT, H.T., State School, Buderim.

By experiments carried out in different places, it has been conclusively proved that potash is most essential to ensure successful results from the manuring of bananas. Owing to the war, potash cannot be obtained, as Germany was the sole source of supply. Growers are therefore in rather a quandary as to what is the best thing to do under the circumstances. Numerous inquiries on this subject have led the writer to give a short résumé of his investigations on this subject, with acknowledgments to J. C. Brünnich and Alfred E. Stephens.

*The Influence of Lime.*—The chief function of lime is a mechanical or physical one on the soil texture. Heavy clayey soils are rendered more friable and less tenacious, whilst, on the other hand, light, sandy soils are made more retentive by its use. It is the chemical action of lime,

however, which concerns us more closely at present. Lime counteracts any acidity and destroys the ill-effects of certain soluble iron salts.

It, again, *liberates valuable mineral plant foods,* chiefly *potash, existing in unavailable form,* and helps in the decomposition of organic (vegetable, &c.) matter.

Lime favours bacterial activity by counteracting the formation of excessive and undesirable acidity. Particularly does it assist the valuable bacteria of nitrification, which change ammonia salts into nitrates, and in making the nitrogen available to plant life. It is only by the action of the myriads of bacteria, with which every fertile soil teems, that the different plant foods in organic materials are made available to the crops.

Lime, as a direct plant food, is commonly present in most comparatively virgin soils in sufficient quantities. With constant cropping, cultivation, and the action of the continuous use of certain fertilisers, such as sulphate of ammonia, superphosphate, dried blood, &c., *the lime becomes gradually removed,* so that the soil, besides becoming possibly actually deficient in lime as a plant food, also acquires an acidity or sourness unfavourabe to successful plant growth.

It therefore follows that, where orchards have been previously manured heavily with potash and dried blood, sulphate of ammonia, or superphosphate, without periodical applications of lime, great results may be expected from applying heavy dressings of lime, followed two months later with applications of dried blood and superphosphate.

In order to demonstrate this, the bananas on the school plot were given a heavy dressing of lime—4 to 5 lb. per stool—at the end of July, while this month (October), 2 lb. of dried blood and 1½ lb. of superphosphate were applied to each stool.

Slaked lime (agricultural lime) is recommended in preference to limestone screenings which, though cheaper, are slower in action.

It must not be inferred that potash manures can be dispensed with altogether, but that, so long as sufficient potash is present in a soil, either naturally or as a result of previous heavy potash manuring, liming and manuring as above will help to temporarily dispense with the necessity to use further potash.

Remarkable improvement is noticed in the school vegetable plot from the use of lime this year. Hitherto only very average results have been obtained, even when manuring the vegetables with farmyard manure, with the addition of dried blood, superphosphate, and potash. So much has this been the case, that successful vegetable growing under ordinary conditions was almost despaired of. Lime has changed all that. Light dressings of lime before digging up the beds and the addition of small quantities of lime to the water-tank and the vegetables, now bear comparison with the best, even though artificial fertilisers have been dispensed with.

## FRUIT-GROWING IN QUEENSLAND.

In the very early days of fruit-growing, with special reference to citrus fruits and pineapples, very good returns rewarded the growers, notwithstanding the want of experience in the business, and the absence of any expert assistance. This refers to the early sixties, when the only remedy for citrus pests was what was known as Gishurst's compound. But as time went on, the Agricultural Department, recognising the probable great future of this industry, stepped in to assist the fruit-growers by the appointment of instructors, whose life business it had been to study the causes of failures and the best means of combating the multifarious fungoid and insect pests which militated against success in the fruit-growing industry.

When Mr. A. H. Benson arrived in Queensland in 1896 and was appointed to the superintendence of this business, a radical change was effected. He brought to bear, on the citrus industry especially, his experience in America. He showed how fungoid and insect pests could be controlled by various means, and it was mainly owing to his work in Queensland, assisted by Messrs. Voller and Soutter, that to-day the fruit-growing industry from South to North is in a most thriving position.

Not to take a general view of the fruit-growing business in this State, we may cite, as one instance among many, the case of a fruit-grower (one of several) in the Blackall Range, who has so profited by the advice of the gentlemen named, and particularly by the advice of the Agricultural Chemist, Mr. J. C. Brünnich, who has done such splendid service to both citrus and banana growers throughout the State in advising as to the best manures to be applied to these crops.

In the instance above-mentioned, results of pineapple crops have been forwarded to Mr. Benson, and these have been verified.

The grower at Woodford planted 2 acres of rough pines three years and two months ago (December, 1911), and 1 acre of smooth pines one and a-half years ago, and the following is the account of pineapples sent to Brisbane by rail in 1915 (from this area of 3 acres) :—

PINEAPPLES SENT PER RAIL FROM WOODFORD, 1915.

| —— | CASES. | WEIGHT. | | | |
|---|---|---|---|---|---|
| | | Tons | cwt. | qr. | lb. |
| Summer Crop, February to March .. .. .. | 928 | 27 | 0 | 0 | 0 |
| Winter Crop, June to 11th October .. .. | 196 | 6 | 1 | 0 | 14 |
| | 1,124 | 33 | 1 | 0 | 14 |

In addition to the above, 15 cases were disposed of locally, and there were still a few cases to market.

The pineapples (2 acres) were planted between oranges and mandarins. Last summer, from 1 acre of "Smooths" (18 months planted), 225 cases of fruit were cut (case weight, net about 70 lb.). For the

winter crop, 182 cases were obtained, and still other fruits coming along. As shown by the above figures, up to the 30th September, 1915, the grower sent by rail this year 1,110 cases of pines, equal to 32½ tons from 3 acres, and still there would probably be 50 cases more to follow off the same area.

In addition to the freight (£11 17s. 10d.), freight was paid on a few cwt. of fertilisers.

These results are facts which can be verified by account sales, &c.

From our personal knowledge of the district, we can state that the soil, though of a deep, friable sandy nature, is by no means rich in plant food, but this only goes to strengthen the argument that by careful cultivation and judicious manuring, such results are almost certain to follow. As to the financial aspect, pineapple growers need not to be shown the profit on such transactions. They well know what expenses are incurred in manure, fruit cases, labour, &c.

## DIRECTIONS FOR CANNING TOMATOES.

Select firm red tomatoes of uniform size; put into tray; and lower into boiling water for about 1 minute to make skins come off easily. Plunge into cold water to make fruit firm and peel promptly. Use a slender pointed knife to cut out the core, being careful not to cut into the seed cells.

All cans and utensils should be thoroughly sterilised by boiling for 20 minutes. Pack tomatoes in can as closely as possible to within ¼-inch of the top. Weigh cans; No. 2's should contain not less than 20 oz., and No. 3's not less than 33 oz., of tomatoes.

Mix sugar and salt in the proportion of one-third salt and two-thirds sugar. Put 2 level teaspoonfuls of this mixture in each No. 3 can of tomatoes, and 1 teaspoonful in each No. 2 can. Put the cap on the can, leaving the vent hole open; place cans in tray; and lower into boiling water, almost immersing, allowing cans to remain for 3 minutes to drive out the air. Tip the cans immediately after exhausting, and completely immerse in boiling water. No. 2 cans require 15 to 20 minutes' cooking; No. 3 require 22 to 30 minutes. Count from the time the water first boils, after immersing the cans, and keep it boiling constantly. Cool as quickly as possible.

If glass jars are used, put tops on loosely, set in water nearly to top and boil—pint jars 25 minutes, and quart jars 30 minutes. The top should be tightened as soon as the jars are removed from the water. Be careful in removing not to place jars in a draft.

In canning with a steam pressure canner, the cans are capped and tipped immediately after filling. Place in canner and process. No. 2 cans require 20 minutes at 228 degrees, 5 lb. pressure; No. 3 cans, 28 minutes at 232 to 235 degrees, 7 lb. pressure.—"Modern Farming."

# Horticulture.

## LIQUID MANURE.

Stable, cow, sheep manure, and poultry droppings can be used as liquid manure.

Many people have an aversion to using these because of the unpleasant odours.

For those who prefer the artificial manures we can recommend nitrate of soda, sulphate of ammonia, sulphate of potash, and Peruvian guano. The latter manure, when good, makes a first-class liquid manure, but we prefer the first three.

The ammonia and nitrate of soda produce luxuriant growth and must be used cautiously. A tablespoonful of either to two gallons of water makes a strong manure, and seldom requires to be used stronger. It is better to make the manure half the strength for most plants, otherwise there is a danger of killing the plants. We are now referring to ordinary garden plants.

Avoid wetting the leaves with the artificial manures. Some tender annuals can't stand such treatment.

If it is necessary to use sulphate of potash with either the ammonia or nitrate of soda, the amounts used must be lessened, say, half of each. Half a tablespoonful of each to about four gallons of water is quite safe.

Don't use these stimulants oftener than once a week. Once a fortnight is much safer.

Before applying the manure, wet the soil thoroughly, then apply the liquid manure some hours afterwards.

These tonics may be used on most of our spring flowers, roses, sweet peas, pansies, petunias, and most flowering plants in the conservatories.

If you want delicate and handsome blooms, use the liquid manures very sparingly.—"Garden and Field."

## KEROSENE EMULSION.

Following is Professor Cook's formula for making kerosene emulsion, as given in his lecture before the Escondido Farmers' Institute:—"Dissolve from one-eighth to one-fourth pound soap in two quarts water. Remove from fire and add one pint of kerosene. Stir very vigorously, either by use of an egg-beater for small quantity or a force pump in case of a large amount. In the latter case use a small, single opening for nozzle, and pump the liquid back into itself. An emulsion will look like rich cream, and the kerosene will be permanently mixed. Now add seven pints of water, and it is ready for use. The application should be made with a force pump, and should be very thorough, as it must touch every insect.

# Tropical Industries.

## THE VALUE OF MANURE FOR SUGAR-CANE.

The "Journal of the Board of Agriculture" of British Guiana (Demerara) says that recent experiments conducted in various parts of Hawaii have shown that plant cane from an unmanured field will yield 25 to 30 tons of cane per acre, whilst by judicious manuring these figures reach as high as 40 to 42 tons per acre; and 4 to 6½ tons of sugar per acre were obtained from the completely manured plots against 3 to 4¼ tons where unmanured.

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## RUBBER IN MALAYA.

Notwithstanding the reduction in the price of plantation rubber of late, several plantations in Malaya and the Straits Settlements have returned handsome dividends to shareholders. Following is a statement published in "Grenier's Rubber News" of the results of the Bukit Rajah Rubber Company for the year ended 31st March, 1915, which must be highly gratifying to the shareholders:—

The company repeats its 1913-14 dividend of 50 per cent., writes off £5,000, by way of depreciation, against £3,000 the year before, and carries forward £8,003. The reserve account now stands at £21,000.

A statement is furnished of the crops of the various products and profits of the company for the last eleven years, and we quote the dividend distribution over this period:—

| | Per cent. |
|---|---|
| 1905-6 .. .. .. .. .. | 6 |
| 1906-7 .. .. .. .. .. | 30 |
| 1907-8 .. .. .. .. .. | 30 |
| 1908-9 .. .. .. .. .. | 55 |
| 1909-10 .. .. .. .. .. | 150 |
| 1910-11 .. .. .. .. .. | 150 |
| 1911-12 .. .. .. .. .. | 150 |
| 1912-13 .. .. .. .. .. | 125 |
| 1913-14 .. .. .. .. .. | 50 |
| 1914-15 .. .. .. .. .. | 50 |

The crop for last year came up to within 6,500 lb. of the estimate; and it is expected that a crop of 705,000 lb. will be harvested for the current year. The total area under rubber is 3,890 acres, of which 1,521 are not

in bearing, so that there is a splendid prospect before the company. It is not proposed to open any further clearings during the year. The average yield per acre last year was equivalent to 284 lb., as compared with 263 lb. in 1913-14.

All-in cost has been brought down to 11·82d., and is made up as follows:—

| | d. |
|---|---|
| F.O.B., Port Swettenham .. .. .. .. .. | 8·39 |
| Freight, insurance, and selling charges .. .. .. | 1·59 |
| Directors' remuneration, income tax, and London charges | 1.84 |
| Total .. .. .. .. .. .. .. | 11·82 |

## GINGER.

Ginger may be planted from August to November, or as late as December, putting the sets about one foot apart each way. The white varieties do better if planted twenty inches apart, and eight inches apart in the rows, the yellow requiring more space. When planting, the sets should be merely covered with soil, or, better still, with old cow manure. The shoots will come above ground in twelve or fourteen days. The only cultivation needed is to keep the surface soil loose and clear, but not more than an inch of soil should be stirred. During the process the plants are all the better for a few shovelfuls of rich, old compost added to the surface; the yield is in proportion to the richness of the soil. The roots are ripe in about seven months from the time of planting. The white sorts are the richest in flavour. The smaller, or narrow-leaved, variety is that used for the dry ginger of commerce. For this purpose the roots are allowed to lie in the ground until the leaf stalks have withered. They are then dug up and washed, the outside skin is scraped off, and the roots are dried in the sun.

### PRESERVED GINGER.

To make preserves, the roots are dug as soon as they are fully grown and before the leaves begin to wither; they are then washed and scraped, cut into slices, and put into jars with salt and water for a few hours, or just sufficiently long to take away any earthy flavour. Then the slices are rinsed in clean water, and are put into a jar with a thin syrup made from white sugar. Change the syrup in three or four days, or as soon as it shows signs of fermenting. Reboil it, adding more sugar, and pour it upon the ginger again. This may have to be done three or four times, until the ginger has lost all its wild flavour, and is perfectly sweet and aromatic. It can then be covered up for future use.

## 80 LB. OF RUBBER PER TREE PER ANNUM.

The above is no doubt an extraordinary yield, and throws absolutely into the shade anything recorded before, but one must remember, however, that the tree referred to is now thirty-seven years old, having been planted at Heneratgoda Gardens, Ceylon, in 1877. The tree stands within a few feet of a hard cabook road, and its neighbours (two) are within fifteen feet of it. The most remarkable fact regarding this giant Hevea is the tapping of renewed bark, in one instance after three years, and in another section of the tree after only a year and ten months. We mention this specially, as the opinion is growing stronger daily that even six years is not too long to wait before tapping renewed bark. This heavy bearer cannot, however, be taken as a criterion for determining the time that should elapse before renewed bark is to be tapped. One great difference lies in the fact that this tree was not tapped systematically till it was thirty-two years of age, while plantation Heveas are taken in hand from their fifth year as a rule, perhaps earlier.

A recent issue of a bulletin issued by the Department of Agriculture, Ceylon, gives full particulars regarding the tapping which was begun on 5th December, 1908, and continued daily, on a full herring-bone system of three V's, extending over one-half the circumference, the cuts being one foot apart, and the lowest cut one foot from the ground. On 21st May, 1909, this herring bone (section 1) had been completely tapped, and on the following day a similar herring bone on the opposite side of the tree was begun (section 2). On 24th January, 1910, the second section was completed, and on 26th January a third section was begun, on the same pattern, above the first. The third section was completed at the end of July, 1910, and was followed by tapping on a fourth section, on the opposite side of the tree, *i.e.*, above section 2, on 1st August. This fourth section was completed on 17th January, 1911. Each of the four sections consisted of an area three feet high, extending half round the tree.

The yields from these four sections were as follows:—

| Section. | Duration of Tapping. | Days Tapped. | Total Rubber. Lb. | Oz. |
|---|---|---|---|---|
| 1 | 168 | 153 | 43 | 9 |
| 2 | 248 | 185 | 43 | 7 |
| 3 | 188 | 137 | 34 | 13 |
| 4 | 170 | 125 | 50 | 3 |

Thus for twenty-five months the yield was 172 lb. The out-turn for 1909 was approximately 76 lb., and for 1910, 89 lb. Both knife and pricker were used for tapping, and the tree showed perfect renewal after the first paring and pricking.

### RENEWED BARK.

Tapping was commenced on 1st April, 1911, on the renewed bark of section 1, which was then two years four months old, *i.e.*, from the beginning of the first tapping. The tree was tapped by the same method

as before, but after the first six tappings the pricker was discarded, and the Bowan-Northway knife alone used. Tapping was carried on daily during alternate months until 30th April, 1912, by which time this section had been completely retapped. The following is the results of this tapping:—

| Duration of Tapping Days. | Days Tapped. | Total Rubber. Lb. | Oz. |
|---|---|---|---|
| 396 | 209 | 100 | 10 |

100 lb. in thirteen months is more than double the yield of the same area from original bark. Tapping alternate months, as also the disuse of the pricker, may have had some influence on the result, while climatic differences must also be reckoned with.

In May and June, 1912, the tree was again tapped on sections 2 and 4, *i.e.*, on the side opposite to that on which the tapping was first begun, the renewed bark on section 2 being then about three years old, and that of section 4 a year and ten months old, counting from the beginning of the original tapping. This tapping was continued daily for thirty-seven tappings only.

On 1st November, 1912, tapping was begun on the renewed bark of section 3, which was then about two years nine months old, reckoning, as before, from the beginning of the tapping on the original bark. This tapping was on the original system, and was continued daily, with a rest of six weeks, until 19th August, 1913.

The total yield from this upper section was 97 lb. 4 oz. in ten months, almost the same as that of the renewed bark on the lower section (section 1), on the other side, though the latter was tapped more slowly.

With short intervals this tree was tapped over a period of four years nine months, and yielded as follows:—

| | lb. | oz. |
|---|---|---|
| From original bark .. .. .. .. .. .. | 172 | 0 |
| From renewed bark, section 1, completely tapped .. .. | 100 | 10 |
| From renewed bark, section 2 and 4, partly tapped .. .. | 22 | 9 |
| From renewed bark, section 3, completely tapped .. .. | 97 | 4 |
| Total .. .. .. .. .. .. | 392 | 7 |

It would appear that at the end of 1908 the girth at six inches from the ground was 13 ft.; at three feet, 8 ft. 6 in.; and at six feet, 9 ft. 5 in. The main stem branches into two at about 10 ft. from the ground, and this fact accounts for the greater circumference at six feet than at three feet from the ground. Though it has been styled the Heneratgoda giant, it is not the largest tree in the group. In December, 1911, the tapped tree measured 115 in. at three feet, while the other tree measured 125 in. In August, 1914, the girth of the tapped tree at three feet was 117 in.—"Grenier's Rubber News."

[There is a very old tree standing near old Government House at Port Moresby, Papua, which yielded a fabulous quantity of rubber in a year, but the above undoubtedly beats all records.—Ed. "Q.A.J."]

# Botany.

## CONTRIBUTIONS TO THE FLORA OF QUEENSLAND.

By J. F. BAILEY and C. T. WHITE.

NEW SERIES—No. 1.

### Order MENISPERMACEÆ.

*STEPHANIA*, Lour.

**S. aculeata**, *Bail.* To the description in "Queensland Flora," p. 33, add: Female flowers minute in axillary or terminal panicles. Carpels orange-coloured, compressed, 2 lines long; pericarp succulent; putamen hard, transversely tuberculate-costate.

### Order CRUCIFERÆ.

*CAMELINA*, Crantz.

Erect more or less hispid annuals with sagittate or auricled stem-leaves, and small yellow flowers. Pod obovoid, the partition broad, the valves very convex, with the midrib distinct, the edges flattened, forming a narrow margin round the pod. Styles slender. Seeds several.

**C. sativa**, *Crantz.* (False Flax.) Stem simple, or slightly branched, 1-2 ft. high. Lowest leaves stalked, upper ones sessile, stem-clasping with rounded auricles, lanceolate, entire or toothed, 1-2 in. long. Flowers numerous. Pods about 3 lines long on pedicels about twice that length in a long loose raceme.

Hab.: A native of Southern Europe and temperate Russian Asia, widely spread as a weed of cultivation, especially in grain and flax fields, over the world; has lately established itself about Brisbane, coming up spontaneously with flax.

### Order LEGUMINOSÆ.

*CASSIA*, Linn.

**C. costata**, *Bail. f. & White*, sp. nov. (Plate 22.) Shrub 6 ft. Glabrous. Stems costate with more or less prominent ribs. Leaflets 4-6 rather distant pairs, oblong-linear, $\frac{1}{2}$ to $1\frac{1}{2}$ in. long. Gland stipitate between the lowest 1 or 2 pair of pinnæ, but often wanting. Stipules small. Flowers in short umbel-like racemes in the upper axils. Peduncles about $\frac{3}{4}$ in. long. Bracts $1\frac{1}{2}$ line long. Sepals unequal broadly ovate, 2-3 lines long. Petals unequal, 4-5 lines long. Stamens all perfect. Anthers equal, all on short filaments. Ovary sericeous. Pod glabrous, shortly stipitate, 3-4 in. long, curved sometimes into almost a circle. Seeds 15-20, black, shining, attached to a long funicle.

Hab.: Woolgar, *E. W. Bick*, August, 1915.

This new species belongs to Bentham's section *Psilorhegma*, and differs sufficiently in several details from all other species of that group to take specific rank. Its position in the Queensland species is between *C. glauca* and *C. retusa*.

PLATE 22.—CASSIA COSTATA, *Bail. f. and White, n. sp.*

### Order FUNGI.

The following additions to our Fungi have been determined at the Royal Botanic Gardens, Kew, England.

**Agaricus (Clitocybe) decastes,** *Fries.* prox.

Hab.: In grass land Botanic Gardens, Brisbane.

**Megalonectria nigrescens,** *Kalch. et Cke.*

Hab.: On dead stems of *Ficus pumila*, Botanic Gardens, Brisbane.

**Uredo pelargonii,** *Thuem.*

Hab.: On Pelargonium leaves, Brisbane, *F. Burtt.*

**Pestalozzia breviseta,** *Sacc* (?).

Hab.: On leaves of *Kennedya rubicunda*, Kedron Brook, *C. T. W.*

**Monilia carbonaria,** *Cooke.*

Hab.: On dead prickly-pear, Dulacca. On burnt stems of bamboo, Brisbane Botanic Gardens.

In "Queensland Agricultural Journal," Vol. III., n.s. (1915), p. 170, this is recorded as **Rhinotrichum pulchrum,** *Berk.* In a note since received from Sir D. Prain he says the correct identification is as above.

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# Science.

## ANALYSIS OF ASH OF CROW'S FOOT ELM.

By J. C. BRÜNNICH, Agricultural Chemist.

With the present scarcity of potassic fertilisers the farmer must be on the lookout for substitutes, and utilise sources hitherto neglected.

The Department of Agriculture and Stock has repeatedly asked for samples of any material which, may be, contain appreciable amounts of potash.

A fairly complete list of wood and plant ashes was published in the list of analyses of fertilisers which appeared in the August number of this journal.

Mr. A. E. Stephen, the delegate of the Chilean Nitrate Committee of Australasia, collected a sample of the ash of crow's foot elm in the Atherton district, and from the analysis below it will be seen that such ash would be a highly valuable fertiliser for crops like maize, potatoes, vegetables, &c., on account of the fairly high amounts of potash and phosphoric acid contained in this ash.

The ash contains, in per cent.—

| | |
|---|---|
| Lime .. .. .. .. .. | 46.91 |
| Potash .. .. .. .. | 5.75 |
| Phosphoric acid .. .. .. | 6.24 |

# Entomology.

## NOTES ON EXPERIMENTS FOR THE CONTROL OF THE SUGAR CANE BEETLE.

By E. JARVIS, Entomologist, Bureau of Sugar Experiment Stations.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. E. Jarvis, Entomologist to the Bureau:—

Experimentation against the grub stage of *Lepidiota albohirta* was carried on for a time, but discontinued about the middle of August owing to the majority of the grubs having ceased feeding preparatory to pupation.

Arrangements are being made to conduct a few initial experiments in connection with oviposition, and to resume research work instituted last season relating to the control of the adult beetle.

The period which immediately follows the primary emergence, and lasts about a month, is naturally of great economic importance, embracing as it does both adult and egg stages, and thereby affording possibilities of getting at the root of the trouble by preventing deposition of the eggs, or destroying them in the soil.

It is hoped that these experiments will to some extent test the value of the following remedial methods applicable to the beetle and egg stages:—

(1) Trapping beetles by means of artificial light.
(2) Trapping beetles by means of attractive odours.
(3) Preventing the laying of eggs by poisoning the adult female.
(4) Controlling oviposition by means of attractive ground traps.
(5) Preventing deposition of eggs by means of deterrents applied to the surface of the ground, or injected into the soil.

Preliminary trials respecting method No. 2 were started last November, but yielded negative results.

I have not hitherto alluded to these experiments, although of opinion that such work may prove of great value and is well worth following up.

This field of research is especially fascinating from a scientific standpoint, seeing that it calls for a knowledge, not only of entomology, but of biology, chemistry, physics, &c.

The subject is, of course, too complex to admit of full discussion in this report, but I may mention that the results obtainable are entirely dependent on certain influences arising from the operation of various

natural laws that govern the movements of insects. For instance, we find that artificial light, whilst repellent to some species, is more or less attractive to others. The moth or beetle that flies into the lamp flame, however, must not be held accountable for such action, as it is merely responding to the influence of forces over which it has no control. Similarly, decaying animal matter emits an odour that compels blow-flies and other insects to approach and settle on it, and, whilst under its domination, to deposit eggs that later on produce maggots destined to serve a useful purpose in the economy of nature.

We may, therefore, reasonably assume that the movements of our mealy-back cane-beetle are determined by forces that probably exercise important influences on the flight of the adult female prior to oviposition.

Canegrowers might render valuable assistance in this connection if they would occasionally watch the beetles whilst swarming at dusk and, in the event of noticing abnormal numbers congregating on the ground, either close to the house or in the field, as though attracted to a particular spot or portion of land, &c., communicate at once with the Entomologist at Gordonvale.

Methods 1 and 3 have already received a share of attention and appear worthy of further investigation, but Nos. 4 and 5 have not hitherto been studied.

## PRICKLY-PEAR AS STOCK FEED—EXPERIMENTS IN INDIA.

Prickly-pear Feeding Experiments (Horn, E. W., Department of Agriculture, Bombay, Bulletin 58 of 1913, Bombay, 1914).

In order to determine the possibility of using prickly-pear (Opuntia) as fodder during times of famine, some feeding experiments were carried out at the Government Civil Dairy, Kirdee. Six bullocks were fed with a mixture of 100 parts of prickly-pear to 6 parts of cotton seed at the rate of 72 lb. per 1,000 lb. live weight per day for six months. The prickly-pear was prepared for consumption by first burning off the spines over a stove and then cutting the slabs into small pieces my means of a chaffcutter or a chopper; the burning was accomplished at various rates, from 30 to 100 lb. per hour according to the stove used.

The animals were in very poor condition at the beginning of the trial, and all improved markedly as time went on; four out of the six took the ration readily from the first, while the other two were longer in getting accustomed to it. The fodder was also fed successfully to a mixed dairy herd of cows and buffaloes in quantities up to 14 lb. per head per day and to young stock. Altogether, as a result of the trials, it may be said that the mixture of prickly-pear and cotton seed used will not only support life but enable an animal to regain condition even after it has become very poor from semi-starvation.—"Monthly Bulletin of Agricultural Intelligence and Plant Disease."

# General Notes.

## WOMEN AND THE WAR.

Every woman who, by working, helps to release a man or to equip a man does National War Service. In the country districts, the right kind of war work is to help in every way practicable to produce and harvest as much food as possible.

## KEEPING MILK SWEET IN HOT WEATHER.

A pinch of carbonate of soda will keep milk or cream sweet in hot weather. In hot weather, when meat is likely to be tough, dip it in vinegar before cooking. This will make it tender. Milk will remove inkstains from carpets, tablecloths, &c., if applied directly.

## DESTROYING TIMBER BY POISON.

Frilling trees and applying an arsenic solution gives good results. For the preparation of the poisonous solution the Agricultural Chemist recommends the use of caustic soda instead of washing soda, as no boiling is required. Mix dry arsenic (3 lb.) with caustic soda (1½ lb.) and add water slowly. Make up to 5 gallons; 5 lb. of saltpetre can be added to aid burning. Strong sulphuric acid mixed with nitric acid has been tried for the purpose, but found to be practically useless. Only in the case of very soft scrub timber does an injection of acid bring about decay. The addition of saltpetre to the arsenic solution facilitates burning.

## PREVENTION OF HOG CHOLERA.

An American farmer, writing on this subject, gave his own experience of the use of wood-ashes as a cure for hog cholera:—"Now more than sixty years ago I read in a farm paper that wood-ashes would prevent cholera. At once I filled a lard tin with ashes and carried the ashes to the five hogs left, and they devoured the ashes as so much corn mush. I had lost then nearly 200 hogs. Since then I have given my hogs wood-ashes, and never have lost one. Before this when I killed my hogs I would have to throw away nearly all the livers because they were so diseased. I would find worms 10 in. long, and as large as a cedar pencil, in the entrails. Now livers are all good and sound, and there are no worms in bowels. Before using ashes the hogs were very hard to fatten; now I have no trouble in this respect."

It is stated that where sour milk is fed to hogs they seldom fall victims to hog cholera, when they are otherwise kept in good condition.

## A HANDY DEVICE FOR GROWING FERNS.

It is surprising (says "South African Gardening and Home Life," 15th September) what an ingenious brain can do with only a few oddments, and an instance of this was brought to our notice a few days ago, when a friend introduced us to the method of growing ferns here described.

Out of an old porous land drain, a flower pot, and some virgin cork he had made one of the most effective fern holders we have ever seen. We were surprised at the success of this simple method, and have, therefore, decided to illustrate it at once.

Our friend takes a good-sized flower pot or fern basket, blocks up the hole at the bottom of the pipe, and then inserts it, as shown in Fig. 7. Round this he packs soil, ramming it in tight, so as to support the

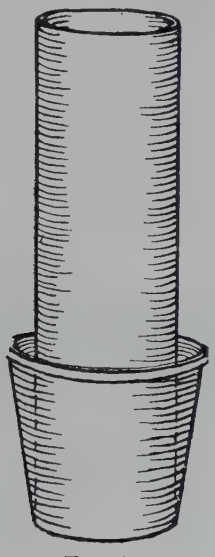


Fig. 1.

Fig. 2.

drain. If a basket is used, and it had been employed in several cases with great success, then the bottom end of the drain is plugged. The next thing to be done is illustrated in Fig. 2, when soil is clamped round the drain pipe and held in place by good broad pieces of virgin cork. The cork leans slightly away from the pipe, in order to form pockets in which to plant ferns. By careful selection of the pieces of cork used, this can be done quite naturally, because the rugged twisted surfaces lend themselves to this arrangement, and it is really easier to accomplish than it sounds. The cork should be fastened with stout wire round the pipe and securely fixed. It is important that this be carefully done, for, should the cork become loose when the ferns are at their best, the soil will be disturbed and the whole ruined.

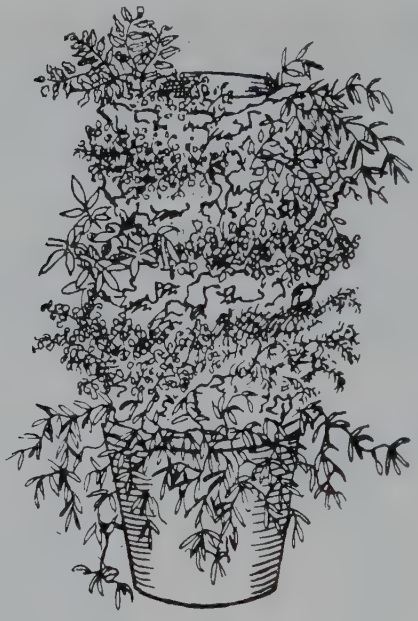


Fig. 3.

Fig. 3 shows the device planted. Most kinds of ferns are quite suitable for this purpose; Adiantums (Maiden Hair), Nephorolepsis, Aspleniums, Platyceriums (Stag's Horn), are perhaps the best.

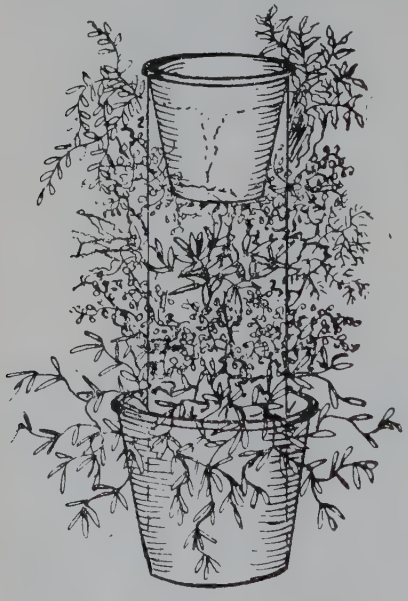


Fig. 5.

Fig. 6.

In the top of the pipe a specimen fern, in a pot, of such size that the rim of the pot rests upon the rim of the pipe, is placed (Fig. 5); this gives the finishing touch to the ferny pillar. But, perhaps, some readers are thinking that it will be a hopeless task to keep the roots moist during the hot weather. This, however, is just where the device

scores, and less difficult watering is experienced than by growing ferns in the ordinary pots or tins. Every day the pipe must be filled up, as shown in Fig. 5, but no further thought need be bestowed on the ferns throughout the day. The water in the pipe oozes through to the soil round the pot, providing almost ideal watering, as the water does not lie about the crowns of the plants, but at the top of the roots, just where it is needed, and upon removing a portion of the soil from the side of one of the pipes we found that the roots of the ferns were clinging to the surfaces of the pipe. The prettiest arrangement we saw was that of *Asparagus plumosus* planted in the lower pot with a maiden hair fern up the sides of the pipe, and an ostrich feather fern in the pot at the top.

Fig. 4.

Another very pretty pole was made of a mixture of ferns, and, perhaps, for interest this might be considered the most desirable arrangement, for many classes and varieties of ferns were growing together. Side by side, for instance, were seen the fine pinnate fronds of the Maiden Hair and the solid horny ones of the Stag's Horn fern; Bird's-nest ferns, with their stiff upright fronds, formed a striking contrast to the Spider ferns (Pteris). In short, in this wonderful device we had a regular fernery, and by no other means with which we are acquainted could such variety of plant life be suitably collected into natural surroundings.

Some readers may prefer the use of the hanging basket instead of a pot at the base of the pipe; and, when it is desired that the whole shall hang, the chain or the iron supports of the basket should be opened, fastened to a piece of wire run round the pipe towards the top, and the wires run from this over the head of the pipe, jointed together, and fastened to a hook in the usual way for hanging. The advantage of this method is that a much longer pipe can be used, as, of course, in this case, the fernery will hang and not have to stand, as when a pot is employed. Both methods, however, have their particular advantages. When a pot is used at the base, the pot at the top is more easily removed, because there are no strands of wire to get in the way, but the hanging arrangement is certainly more artistic, especially if advantage is taken of the chains or wires that support the basket, to train up varieties of climbing subjects, such as *Smilax, Asparagus plumosus nana,* &c.

# LONG MOTOR TOUR.

## 2,650 MILES THROUGH QUEENSLAND.

What is perhaps one of the longest motor tours ever undertaken throughout Queensland has just been completed by Mr. G. W. Whatmore, director and manager of the Ford Motor Company, accompanied by his brother, Mr. J. S. Whatmore, of Sydney, the latter coming to Brisbane expressly for the trip, the object of which was to personally visit the "Ford" Agents throughout Central and Western Queensland.

Mounted on a 20-h.p. "Ford" single seater car they left Brisbane on Saturday afternoon, the 25th September, Mr. T. R. Hall, of Brisbane, accompanying them as far as Toowoomba, where a halt was made for the night. Miles was reached the next evening; thence the journey was continued and the subsequent days' drives finished at the following towns.—Roma, Morven, Charleville, Listowel Downs, Blackall, Longreach, Winton, Mackinlay, Cloncurry, Gilliatt, Hughenden, Muttaburra, Aramac, Banchory Station, Emerald, Planet Downs, Taroom, Miles, and Brisbane, covering in all a distance of 2,650 miles.

Considering the drought conditions, taken as a whole, the roads may be classed as excellent, and the journey, which occupied three weeks, was completed without any difficulty whatever. Generally speaking, the condition of the country, which is in the grip of one of the severest droughts on record, is perhaps as bad as it is possible to imagine; in fact, the city folk have not the faintest conception of the appalling conditions which exist. The stock, both sheep and cattle, is being seriously depleted. Even with the millions of stock in the country it is a struggle which cannot endure indefinitely, and unless the drought terminates at an early date there will be still greater losses. Certain of the localities mentioned have been favoured with light to moderate rains during the past few months, and the wonderful response of grass and herbage is reflected in the condition of the stock, but unless further rains occur the spring herbage will be dried up by the summer heat, with the consequences which need not be described.

Conspicuous use has been made of scrub timbers in an endeavour to keep life in the starving stock. For hundreds of miles mulga, mallee, and coolabah scrubs have been cut down, but, unfortunately, in many localities only small quantities of the above edible scrubs are left standing, so that unless rain falls at a very early date the position of the stockowners can be better imagined than described. Indeed, so desperate have matters become that endeavours are being made to keep life in the stock by feeding them on prickly-pear, which, unfortunately, abounds in some of the richest country in Queensland. Whilst on this question it might be interesting to the community to know that the prickly-pear pest is rapidly spreading over all parts of Central Queensland. Its insidious growth is so vicious that once it takes root it is almost impossible to eradicate it. Practically the whole of the country from Toowoomba to Morven, a distance of 350 miles, is thickly infested to such an extent that the road in places is almost impassable. A slight idea of the seriousness of the situation may be gathered when it is mentioned that the cost of clearing the pear is greater than the value of the land, the consequent result being that the pest is allowed unrestricted freedom to spread in all directions, and this vast area forms a propogating nursery whereby the seed is disseminated to germinate in localities situated hundreds of miles distant, being conveyed by passing cattle, birds, and wind: in fact, heavy growths of prickly-pear were seen as far north as Springsure. The only serious attempt at eradication appeared to be at Dulacca, where the syndicate controlled by Mr. Roberts has been endeavouring to exterminate it by means of poisonous gas. For upwards of 10 miles the effect of gas was apparent on the pear leaves. Its effect is to cause a brown discolouration which, outwardly, indicates a withering and dying of the leaf, but the treatment does not apparently penetrate into the sap, as on all sides can be seen the spring growth of young healthy off-shoots. The community at large have no conception of the great pear curse which, apparently uninterruptedly, is spreading itself over millions of acres of the best of Queensland country.

For upwards of 2,000 miles rabbit-proof fences were seen, though, strange to say, not one single rabbit could be seen, the drought apparently being responsible for this.

It is not, then, to be wondered at that the price of beef and mutton is extraordinarily high.

Even the wheat growing, in so far as the attempts which have been made between Toowoomba and Roma are concerned, are melancholy failures, and the "looked for" fields of grain have been converted into temporary pasturage for starving stock. On one station passed through 1,000 sheep were found in one flock suffering through eating heart-flower scrub, a poisonous weed growing near Aramac.

Many rivers were crossed, including Maranoa, Langlo, Barcoo, Thompson, Alice, Alpha, Nogoa, Comet, Dawson, and Warrego, &c., but all were rivers in name only,

being, in fact, nothing but dry sand beds to negotiate which, however, did not offer much difficulty to the "Ford" car.

One of the significant features observable during the trip, and more particularly in the drought-stricken area, is the common use of motor cars and motor lorries against old time horse teams, owing to the fact that the country is so abnormally dry, and, in the absence of natural grass, horses have to be stable fed. It can be easily understood, therefore, that with chaff costing upwards of 4d. per lb., it makes the use of horses almost prohibitive, and the timely intervention of the motor car to the man located, in many cases, hundred of miles from the nearest railway, is a boon not measured by words. Any taxation therefore on the motor car should receive very careful consideration at the hands of the Legislators before being imposed.

Mr. Whatmore was more than pleased at the results of his visit, and speaks in glowing terms of the wonderful demand for "Ford" cars in all parts of Queensland, in connection with which it may be mentioned that two vessels—the "Kilpurney" and the "Howth"—are coming direct to Brisbane and are now due with no less than 314 "Ford" cars, all for Queensland. The significant feature lies in the fact that the bulk of the above shipment is already sold. The Queensland Motor Agency, Limited, who are the agents for the "Ford" cars in Queensland, however, have further large shipments coming regularly to Brisbane, including the steamer "Bericklaw," which is coming direct to Brisbane, *viâ* Panama Canal, with 84 "Ford" cars for this State.

## SCRUB TICKS AFFECTING DOGS, FOALS, CALVES, AND SHEEP.

By W. G. BROWN, Instructor in Wool and Sheep.

In consideration of the losses sustained from the scrub tick pest, too much prominence cannot be given to a cure. Mr. A. H. Cory, Chief Inspector of Stock, advises me that the treatment given below is an excellent remedy against scrub-tick poisoning.

Scrub ticks cause a great deal of trouble to stockowners in certain districts, with a large percentage of mortalities. It has been stated that these ticks do not harm the animals during the first four days' attachment, so it is recommended that, where scrub ticks are prevalent, valuable animals should be thoroughly examined every second or third day.

It has been proved that trypan blue, injected under the skin, is a specific for this disease in the dog. The paralysis soon improves, and in a few days the animal thoroughly recovers. One dose of the trypan blue is usually sufficient.

A 2 per cent. solution (about 9 grains to a fluid ounce of water) is made by dissolving the trypan blue in boiling water. A sediment falls as the solution cools, and this should be removed by filtering through a funnel, in which a properly folded filter paper is placed, or a fine piece of clean linen which has been previously boiled.

The hypodermic syringe and needle, before being used, should be placed in a dish containing cold water, then placed over the fire and the water boiled for some ten minutes; this thoroughly sterilises the syringe and needle, which is now ready to use when the solution to be injected has cooled.

The injection can be made anywhere under the skin, but the best positions are either in front of the chest or behind the shoulder, the skin in these positions being loose a fold of which is easily caught up by the finger of the left hand, whilst the needle is inserted with the right hand.

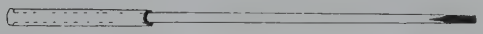
It is advisable to clip off the hair and disinfect the spot chosen before introducing the needle.

The dose for dogs, according to age and size, varies from 1 to 5 drachms or 1 to 5 teaspoonsful. The dose for calves, foals, and sheep, according to age and size, from ½ oz. to 2½ oz. or 1 to 5 tablespoonsful.

### DESTROYING ZAMIA PLANTS.

With reference to the destruction of Zamia Plants, Mr. T. Kitchen, Cattle Creek, Mount Morgan, writes:—

I read in my last Journal (1st October) Mr. J. F. Bailey's mode of destroying the Zamia Plant. Having myself had some experience of destroying Zamia without the use of poison, I am forwarding you the method I use. Get a blacksmith to put a sharp chisel point on a 5-ft. crowbar, weld a ring 18 in. from top of bar, slip over top of bar a piece of piping and weld head on top to keep piping in place. Sew a piece of



leather over the piping, which prevents any jar on the hands when the bar is ready for use. Drive the bar in a slanting direction into the plant close to the ground, repeat on the opposite side and lever the top off the plant. Next drive the bar down the middle of the petals and lever from side to side, which will burst all the remaining butt and always proves fatal. The idea of the bar is to get easier driving power and better leverage. My neighbour, Mr. Jones, has cleared upwards of 2,000 acres, and I myself have cleaned my paddocks with one operation. I can recommend the above as a quick and effective way of destroying Zamia.

### THE QUEENSLAND TREASURER'S FINANCIAL STATEMENT.

We have to acknowledge receipt, by the courtesy of the Hon. the Treasurer, of the Financial Statement for the year 1914-1915.

## Answers to Correspondents.

### MANGE IN HORSES.

J.O.B., Boonooroo—

Wash the affected parts with warm water and soap, and, when dry, rub in the following dressing twice a week:—Sulphur, 1 lb.; spirits of tar, 2 oz.; olive oil, 1 quart.

### POWDERY MILDEW ON ROSES.

"Inquirer," Dalby—

Some varieties of roses are more susceptible to the attacks of mildew than are others. In these cases, it is advisable as a preventive to, every now and again, dust flowers of sulphur over the plants. Nicholson recommends the following preparation for the disease:—

Boil 1 lb. of flowers of sulphur (or in the proportion required) and 1 lb. of quicklime in 5 pints of water in an earthenware pot for ten minutes. Constantly stir while boiling; then, allow to settle, and pour off the clear liquid for use. The plants should be syringed with a mixture of this preparation diluted with 100 times its bulk in water.

# TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

(From which those at places west of Brisbane can be reckoned.)

Computed by D. EGLINTON, F.R.A.S.

| Date. | September. | | October. | | November. | | December. | |
|---|---|---|---|---|---|---|---|---|
| | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·4 | 5·33 | 5·30 | 5·47 | 4·59 | 6·4 | 4·46 | 6·27 |
| 2 | 6·3 | 5·33 | 5·29 | 5·48 | 4·58 | 6·4 | 4·46 | 6·28 |
| 3 | 6·2 | 5·34 | 5·28 | 5·48 | 4·58 | 6·5 | 4·46 | 6·28 |
| 4 | 6·1 | 5·34 | 5·27 | 5·49 | 4·57 | 6·6 | 4·46 | 6·29 |
| 5 | 6·0 | 5·35 | 5·26 | 5·49 | 4·57 | 6·6 | 4·46 | 6·29 |
| 6 | 5·59 | 5·35 | 5·25 | 5·50 | 4·56 | 6·7 | 4·46 | 6·30 |
| 7 | 5·58 | 5·36 | 5·24 | 5·50 | 4·55 | 6·8 | 4·46 | 6·30 |
| 8 | 5·57 | 5·36 | 5·23 | 5·51 | 4·54 | 6·9 | 4·47 | 6·31 |
| 9 | 5·56 | 5·37 | 5·22 | 5·51 | 4·53 | 6·10 | 4·47 | 6·32 |
| 10 | 5·55 | 5·37 | 5·21 | 5·52 | 4·53 | 6·11 | 4·47 | 6·33 |
| 11 | 5·53 | 5·38 | 5·20 | 5·52 | 4·52 | 6·11 | 4·47 | 6·34 |
| 12 | 5·52 | 5·38 | 5·19 | 5·53 | 4·51 | 6·12 | 4·47 | 6·35 |
| 13 | 5·50 | 5·38 | 5·18 | 5·53 | 4·51 | 6·12 | 4·48 | 6·36 |
| 14 | 5·49 | 5·39 | 5·17 | 5·54 | 4·50 | 6·13 | 4·48 | 6·36 |
| 15 | 5·48 | 5·39 | 5·16 | 5·54 | 4·50 | 6·14 | 4·48 | 6·37 |
| 16 | 5·46 | 5·40 | 5·15 | 5·55 | 4·49 | 6·15 | 4·49 | 6·38 |
| 17 | 5·45 | 5·40 | 5·14 | 5·55 | 4·49 | 6·16 | 4·49 | 6·38 |
| 18 | 5·44 | 5·41 | 5·13 | 5·56 | 4·48 | 6·16 | 4·50 | 6·39 |
| 19 | 5·43 | 5·41 | 5·12 | 5·56 | 4·48 | 6·17 | 4·50 | 6·39 |
| 20 | 5·42 | 5·42 | 5·11 | 5·57 | 4·48 | 6·18 | 4·51 | 6·40 |
| 21 | 5·41 | 5·42 | 5·10 | 5·57 | 4·48 | 6·19 | 4·51 | 6·40 |
| 22 | 5·40 | 5·43 | 5·9 | 5·58 | 4·47 | 6·20 | 4·52 | 6·41 |
| 23 | 5·39 | 5·43 | 5·8 | 5·58 | 4·47 | 6·21 | 4·52 | 6·41 |
| 24 | 5·37 | 5·44 | 5·7 | 5·59 | 4·47 | 6·21 | 4·53 | 6·41 |
| 25 | 5·36 | 5·44 | 5·6 | 5·59 | 4·47 | 6·22 | 4·53 | 6·42 |
| 26 | 5·35 | 5·45 | 5·5 | 6·0 | 4·47 | 6·23 | 4·54 | 6·42 |
| 27 | 5·33 | 5·45 | 5·4 | 6·0 | 4·47 | 6·24 | 4·54 | 6·42 |
| 28 | 5·32 | 5·46 | 5·3 | 6·1 | 4·47 | 6·25 | 4·55 | 6·43 |
| 29 | 5·31 | 5·46 | 5·2 | 6·1 | 4·47 | 6·26 | 4·55 | 6·43 |
| 30 | 5·30 | 5·47 | 5·1 | 6·2 | 4·47 | 6·27 | 4·56 | 6·44 |
| 31 | .... | ... | 5·0 | 6·3 | ... | ... | 4·56 | 6·44 |

## Phases of the Moon, 1915.

On or about the 150th Meridian, East Long.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 2 Sept. | ☽ | Last Quarter | 12 | 56 | a.m. |
| 9 „ | ● | New Moon | 8 | 52 | p.m. |
| 16 „ | ☾ | First Quarter | 5 | 21 | „ |
| 23 „ | ○ | Full Moon | 7 | 35 | „ |

The moon will be at its least distance from the earth, roughly about 226,000 miles, on 14th September; and at its greatest distance, about 252,000 miles, on 2nd and 30th September.

| | | | | | |
|---|---|---|---|---|---|
| 1 Oct. | ☽ | Last Quarter | 7 | 44 | p.m. |
| 9 „ | ● | New Moon | 7 | 42 | a.m. |
| 15 „ | ☾ | First Quarter | 11 | 51 | p.m. |
| 23 „ | ○ | Full Moon | 10 | 15 | a.m. |
| 31 „ | ☽ | Last Quarter | 2 | 39 | p.m. |

The moon will be at its least distance from the earth on 11th October, and at its greatest distance on the 27th.

| | | | | | |
|---|---|---|---|---|---|
| 7 Nov. | ● | New Moon | 5 | 52 | p.m. |
| 14 „ | ☾ | First Quarter | 9 | 3 | a.m. |
| 22 „ | ○ | Full Moon | 3 | 36 | „ |
| 30 „ | ☽ | Last Quarter | 8 | 10 | „ |

The moon will be at its least distance from the earth at midnight on 8th November, and at its greatest distance on the morning of the 24th.

| | | | | | |
|---|---|---|---|---|---|
| 7 Dec. | ● | New Moon | 4 | 3 | a.m. |
| 13 „ | ☾ | First Quarter | 9 | 38 | p.m. |
| 25 „ | ○ | Full Moon | 10 | 52 | „ |
| 29 „ | ☽ | Last Quarter | 10 | 59 | „ |

The moon will be at its least distance from the earth on the morning of 7th December, and at its greatest distance on the morning of the 21st.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 17 m., 28 m., 36 m., and 47 minutes, respectively, later than at Brisbane at this time of the year.

At Roma, on 1st September, the sun will rise about 6·19 and set about 5·51; on 1st October t will rise about 5·46 and set at about 6·4; on 1st November it will rise about 5·18 and set at about 6·20; on 1st December it will rise about 5·7 and set at about 6·41.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed by D. Eglinton, F.R.A.S., and should not be reproduced without acknowledgment.]

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR OCTOBER, 1915.

| Article. | | OCTOBER. Prices. |
|---|---|---|
| Bacon | lb. | 1s. 2d. to 1s. 3d. |
| Bran | ton | £4 15s. |
| Broom Millet | „ | £38 to £40 |
| Butter | cwt. | 140s. |
| Chaff, Mixed | ton | £7 10s. |
| Chaff, Oaten | „ | £7 10s. to £9 |
| Chaff, Lucerne | „ | £10 to £12 |
| Chaff, Wheaten | „ | £4 to £5 |
| Cheese | lb. | 11d. |
| Flour | ton | £17 10s. and £12 |
| Hams | lb. | 1s. 3d. |
| Hay, Oaten | ton | £9 |
| Hay, Lucerne | „ | £6 to £7 |
| Honey | lb. | 3d. to 3½d. |
| Maize | bush. | 5s. 4d. to 5s. 5d. |
| Oats (Japanese) | „ | 3s. 6d. to 5s. |
| Onions | ton | £9 10s. to £12 |
| Peanuts | lb. | 3d. to 4d. |
| Pollard | ton | £6 10s. |
| Potatoes | „ | £15 15s to £16 5s. |
| Potatoes (Sweet) | cwt. | 3s. to 3s. 9d. |
| Pumpkins | ton | £8 10s. to £9 10s. |
| Eggs | doz. | 1s. to 1s. 1d. |
| Fowls | pair | 4s. to 6s. |
| Ducks, English | „ | 4s. to 5s. |
| Ducks, Muscovy | „ | 6s. to 7s. |
| Geese | „ | 7s. to 8s. |
| Turkeys (Hens) | „ | 11s. to 12s. 6d. |
| Turkeys (Gobblers) | „ | 13s. to 14s. |
| Wheat | bush. | 8s. 9d. |

### VEGETABLES.

| | |
|---|---|
| Cabbages, per dozen | 3s. to 4s. 4d. |
| Cauliflowers, per dozen | ... |
| Beans, per sugar bag | 2s. to 3s. 6d. |
| Beetroot, per dozen bunches | 6d to 9d. |
| Carrots, per dozen bunches | 9d. to 1s 3d. |
| Chocos, per quarter-case | 1s. 9d. to 2s. 6d. |
| Cucumbers, per quarter-case | 1s. 6d. to 2s. 6d. |
| Custard Marrows, per dozen | 1s. 6d. to 3s. 6d. |
| Vegetable Marrows, per dozen | 1s. 6d. to 4s. |
| Parsnips, per dozen bunches | 1s. to 1s. 3d. |
| Lettuce, per dozen | ... |
| Peas, per sugar bag | 3s. to 6s. 6d. |
| Celery, per dozen bunches | 10d. to 1s. 6d. |
| Sweet Potatoes, per cwt. | 3s. to 3s. 9d. |
| Table Pumpkins, per cwt. | 8s. 6d. to 9s. 6d. |
| Tomatoes, per quarter-case | 3s. to 7s. |
| Turnips, per dozen bunches | 8d. to 9d. |
| Rhubarb, per bundle | 1s. to 1s. 6d. |

## SOUTHERN FRUIT MARKETS.

| Article. | OCTOBER. Prices. |
|---|---|
| Bananas (Queensland), per case | 12s. to 15s. |
| Bananas (Fiji), per case | 16s. to 18s. |
| Bananas (G.M.), per case | ... |
| Loquats (Giant), per case | 5s. 6d. to 11s. |
| Mandarins, per case | 10s. to 12s. |
| Mangoes, per bushel-case | 12s. to 14s. |
| Oranges (Navel), per case | ... |
| Oranges, per case | 11s. to 13s. |
| Passion Fruit, per half bushel-case | 1s. 6d. to 9s. |
| Lemons, per bushel case | 8s. to 9s. |
| Papaw Apples, per half-case | 7s. to 9s. |
| Pineapples (Queens), per case | 8s. to 12s. |
| Pineapples (Ripleys), per case | 9s. to 11s. |
| Pineapples (Common), per case | 8s. to 10s. |
| Strawberries (Queensland) per tray | 4s. 6d. to 6s. |
| Tomatoes, per quarter-case | 7s. to 10s. |
| Cucumbers, per bushel-case | 6s. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | OCTOBER. Prices. |
|---|---|
| Apples (Tasmanian), per case | 11s. to 13s. |
| Apples (Croftons), per case | ... |
| Apples, Cooking, per case | 10s. to 12s. |
| Bananas (Cavendish), per dozen | 2d. to 4d. |
| Bananas (Sugar), per dozen | $1\frac{3}{4}$d. to $2\frac{3}{4}$d. |
| Cape Gooseberries, per quarter-case | 7s. to 10s. |
| Cocoanuts, per sack | 12s. to 15s. |
| Cumquats, per quarter case | 2s. 6d. to 4s. |
| Custard Apples, per quarter-case | 5s. to 8s. |
| Granadillas, per quarter-case | ... |
| Lemons (Lisbon), per case | 6s. to 8s. |
| Limes (Choice), per case | 2s. to 3s. 6d. |
| Loquats, per quarter-case | 2s. 6d. to 3s. 6d. |
| Mandarins, per half-case | 3s. to 5s. |
| Mangoes, per case | 5s. to 7s. |
| Oranges (Navel), per case | 6s. to 8s. |
| Oranges (other), per case | 6s. to 7s. |
| Papaw Apples, per case | 1s. 6d. to 3s. 6d. |
| Papaw Apples (Prime), per quarter-case | 2s. 6d. to 4s. 6d. |
| Passion Fruit, per case | 7s. to 10s. 6d. |
| Peanuts, per pound | 3d. to 4d. |
| Rosellas, per sugar bag | ... |
| Pineapples (Ripley), per dozen | 8s. to 9s. 1d. |
| Pineapples (Rough), per dozen | 3s. to 6s. |
| Pineapples (Smooth), per dozen | 3s to 6s. 6d. |
| Strawberries, per dozen pint boxes | 4s. 6d. to 10s. 6d. |
| Strawberries, per tray | 4s. 6d. to 6s. |
| Tomatoes, per quarter-case | 3s. to 7s. |

## TOP PRICES, ENOGGERA YARDS, SEPTEMBER, 1915.

| Animal. | SEPTEMBER. Prices. |
|---|---|
| Bullocks ... ... ... ... ... ... ... ... | £20 to £31 |
| Cows ... ... ... ... ... ... ... ... | £15 2s. 6d. to £18 7s. 6d. |
| Merino Wethers ... ... ... ... ... ... ... | 40s. 9d. |
| Crossbred Wethers ... ... ... ... ... ... | 66s. |
| Merino Ewes ... ... ... ... ... ... ... | 33s. 6d. |
| Crossbred Ewes ... ... ... ... ... ... ... | 42s. |
| Lambs ... ... ... ... ... ... ... ... | 37s. |
| Pigs (Porkers) ... ... ... ... ... ... ... | 39s. |

## LONDON QUOTATIONS.

Jute: October-November shipment, £25 per ton.

Cotton: The Liverpool quotation for Middling American cotton, October-November shipment, is 7.15d. per lb.

Sisal: October-November shipment, £34-£36 per ton.

Rubber: October-November shipment—Fine hard Pará, 2s. 5½d. per lb.; plantation first latex crepe, 2s. 6½d.; smoked sheet, 2s. 5⅝d. per lb.

Copra, South Sea: October-November shipment, £24 2s. 6d. per ton.

Danish butter, 205s. to 209s. per cwt. "The Grocer" states that the opening prices for Colonial butter may be 170s. to 180s. per cwt.

# Orchard Notes for December.

By A. H. BENSON, Director of Fruit Culture.

## THE SOUTHERN COAST DISTRICTS.

December is somewhat an off month for pines, though bananas should be improving both in quality and quantity. The purely tropical summer ripening fruits are not yet ready, and, consequently, there is only a limited supply of fruit in this part of Queensland during the month.

Early ripening varieties of grapes will mature, and care should be taken to market them in good order. The first fruit to ripen should be put up in small packages, as, if marketed in this manner, it will fetch a better price, but as it becomes more plentiful it can be packed in larger cases.

Pay particular attention during the month to all peaches, apples, pears, Japanese plums, or other fruits that are liable to be attacked by fruit fly, and see that no fly-infested fruits are allowed to lie about under the trees, and thus breed out a great crop of flies that will be ready to destroy the grape and mango crops as they mature.

If the month is dry, see that the orchard is kept well worked so as to retain moisture in the soil, and, in any case, even should there be a good rainfall, it is necessary to cultivate in order to keep down weed growth, as if weeds are not kept in check now there is little chance of their being kept in hand once the January and February rains set in.

The planting out of pineapples, bananas, and most kinds of tropical fruits can be carried out during the month, especially if there is any rainy weather; but, if the weather is dry, it is better to defer the planting out of tropical fruits till January or February.

The cyaniding of citrus trees can be continued when necessary, and where Maori or orange mite is showing it should be checked at once, as Maori fruit is of no use for the Southern markets, and is unsuitable for export to the old country.

## THE TROPICAL COAST DISTRICTS.

Clean up all orchards and pineapple and banana plantations as long as you have the chance of fine weather, so as to have your land in good order when the wet season commences, as once the rain sets in there is little chance of fighting weeds. Watch bananas carefully for fly, and market the fruit in good order. Handle the crop of pines carefully; don't let the fruit get too ripe, as an over-ripe Northern pine is tasteless. The fruit should be cut as soon as it is fully grown, as even when quite green the rough-leaf varieties have usually developed sufficient sugar to suit most persons' taste. Pack carefully to prevent bruising, and they will carry South in good order.

Only send high-class mangoes South—bad-flavoured sorts, and stringy, carroty, or turpentine flavoured varieties are not worth shipping. High-class fruit will pay to handle carefully, but there is no demand for rubbish, and I am sorry to say that fully 90 per cent. of the mangoes grown in the State must be classed under the latter heading.

Tropical fruits of all kinds can be set out during suitable weather. Fruit pests of all sorts must be systematically fought.

## THE SOUTHERN AND CENTRAL TABLELANDS.

December is a busy month for the growers in the Stanthorpe district. Early apples, plums, peaches, nectarines, &c., will ripen during the month, and must be marketed as soon as ripe, as they do not keep long once they are gathered. Handle carefully, and grade better; there is far too much early rubbish slumped on to the local markets, which tends to spoil the demand as well as the price. Watch the orchards very carefully for Codling moth and fruit fly, and take every possible precaution to keep these pests in check should they make their appearance, as the future cleanliness of the orchard depends very largely on the care that is taken now to keep these pests in check.

If the month is dry, keep the orchard and vineyard well cultivated Watch the vines carefully so as to detect the first signs of Oidium or Anthracnose, and systematically fight these pests, remembering always that in their case prevention is better than cure, and that only prompt action is of the slightest value.

On the Darling Downs every care must be taken to keep the fruit fly in check, and on no account must infested fruit be allowed to lie about under the trees, as this is far and away the best method of propagating the pest wholesale.

In the Central District the grape crop will ripen during the month. Handle the fruit carefully. Cut it when dry, and where it has to be sent long distances to market pack in 6-lb. baskets rather than in larger cases. Where dry, keep the orchard and vineyard well cultivated; and where the citrus and other fruit trees require it, give them an irrigation. Don't irrigate grapes once the seeds have been formed, as it tends to deteriorate the quality, and to make the fruit tender and, consequently, to carry badly.

# Farm and Garden Notes for December.

Too much care can scarcely be bestowed upon potatoes dug up this month to protect them from the sun. They should be dug or ploughed out as soon as the skin is firm, as they are liable to rot in the ground owing to the great heat.

Field.—The wheat harvest will be now nearing completion, and to all appearance the results are not likely to constitute a record, owing to the dry weather during the growing months, and the yield promises to be somewhat unsatisfactory to the wheat-growers. The principal factor operating against a still greater extension of the wheat-growing industry is, that many farmers who formerly grew wheat and barley have turned their attention to dairying, which offers larger and quicker returns.

The dry weather which prevailed during several months gave rise to grave fears for the harvest, but the subsequent timely rainfall came just in time to save the crop in some of the wheat districts. The estimates of the probable yield have varied so considerably that it will be well to wait until the harvest is over before calculating on the result.

Given favourable weather, maize, panicum, imphee, Kafir corn, and sorghum may be sown. Arrowroot, ginger, and sweet potatoes may be sown.

Kitchen Garden.—Gather cucumbers, melons, vegetable marrows, and French beans as soon as they are fit for use. Even if they are not required, still they should be gathered, otherwise the plants will leave off bearing. Seeds of all these may be sown for a succession. Sow cabbage and cauliflower seed. Great difficulty will be experienced in getting these to grow at this season, and the plants will consequently be more valuable in proportion. Tomatoes should be in full bearing, and the plants should be securely trained on trellises or stakes. Take up onions, and spread them out thinly on the barn floor until the tops wither sufficiently to pull off easily. They should then be graded into sizes, and sent to market or stored in a cool place. Where there is an unlimited supply of water, and where shade can be provided, lettuce and other salad plants may still be sown. All vacant ground should be well manured and dug two spits deep. Manure and dig as the crops come off, and the land will be ready for use after the first shower.

Flower Garden.—Keep the surface of the land well stirred. Do not always stir to the same depth, otherwise you are liable to form a "hard pan," or caked surface, beneath the loose soil. Alternate light with deep hoeings. A few annuals may still be planted, such as balsams, calendulas, cosmos, coreopsis, marigold, nasturtium, portulaca, zinnia, and cockscomb. Plant out whatever amaranthus may be ready. These may still be sown in boxes. Clear away all annuals which have done flowering. Bulbs should have all the dead leaves cut away, but the green leaves should not be touched. Stake chrysanthemums, and, as the flower buds develop, give them weak liquid manure. Coleus may now be planted and propagated from cuttings. Dahlias are in various stages, but the greater part will have been planted by this time. Give them liquid manure, and never let them dry up. Lift narcissus about the end of the year, but do not store them. Plant them out at once in their new positions. Top-dress all lawns.

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# Agriculture.

## SCIENCE AND AGRICULTURE.

There are many farmers who poke fun at the scientific man who is trying to help agriculture, and at the "scientific" farmer (says "Garden and Field"). They assert that agriculture has nothing to learn from science, and they are quite content, they say, to go along the old lines.

Let us see now whether their assertions are correct. Smut disease is very prevalent this season in oatfields where untreated seed was planted, but is quite scarce in fields where treated seed was planted. This loss will amount to 15 or even 20 per cent. of the crop. Who devised the method of treatment? The scientific man. Who devised methods of spraying fruit trees and potatoes against insects and fungous disease? Again the scientific man.

Who gave us the information regarding the importance of clover and other leguminous crops in maintaining the supply of nitrogen in the

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soil, and who furnished the information we now possess regarding fertilisers? Again, the scientific man. Who made the wonderful discovery regarding the part played by bacteria in dairying, in canning, in the keeping of food products? Who gave us knowledge of many of the diseases of live stock, so that we are able to guard the health of our animals? Again, the scientific man.

Who worked out practical systems of ventilation in barns and houses, and who made the wonderful improvements in farm machinery? Again, the scientific man. Who gave us the Babcock test? A scientific man. Who has given the improved breeds of cattle, the improved strains of grains? The scientific man.

And so we might continue our list of contributions of science to agriculture—in fact, there is not a single department of agriculture that has not been greatly benefited by science, and yet there are men who have no use for science! Every number of this paper contains contributions from science to agriculture. Present-day farming is largely the application of scientific methods to agriculture.

One important lesson we may draw from the foregoing remarks:—The average farmer can become a scientific farmer by intelligent reading of the best agricultural papers and bulletins. "The art of farming we learn by our hands; the science of agriculture we must learn from the investigations of men of science."

In the preface to a booklet issued by the Department of Agriculture and Stock, Queensland, entitled "Elementary Lessons in Agriculture," in 1908, the following remarks on "Agriculture and Science" will be found:—

"Agriculture to-day is no longer what it was in the early days of settlement in Queensland. Fifty years ago men began farming on rich scrub lands with no other capital than a few tools, strong arms, and determination. Few crops were then grown except corn and potatoes, and perhaps a little lucerne. No science was required; neither ploughs nor horses, nor up-to-date agricultural implements were seen on a farm, nor, indeed, could they have been used. The axe, the hand hoe, and the fire-stick were the means with which the old-time farmer carved out a home for himself, and did so successfully. But times have changed, conditions have altered, and he who would to-day become successful in the pursuit of Agriculture must be armed with a knowledge of the most modern methods of cultivating the soil, combating pests, &c.; and, to achieve his purpose, he must not only be a strenuous worker, but also a reader. His own methods may, to him, seem good, but they may have been improved upon, and all progress must be studied through the medium of agricultural journals and publications of many kinds dealing with the farming profession. If those who enter upon a farming life as a serious business will keep steadily before them that Science enters largely into the occupation of the farmer, the orchardist, the dairy farmer, market gardener, and stock-breeder, and will make it their business to utilise all they can of the means placed at their disposal by

Science, they cannot fail to overcome most of the difficulties with which they have to contend in the way of climatic conditions and of the numerous pests which tax the patience and ingenuity of the man on the land."

---

## COMPLETE FERTILISERS FOR FARM, ORCHARD, AND VEGETABLE GARDEN.

In many localities a heavier dressing of artificial fertilisers may be profitable, using, for instance:—

2 cwt. superphosphate
1 cwt. sulphate of potash
½ cwt. sulphate of ammonia or nitrolim } per acre;

or about ½ lb. of the mixture to each vine.

Green manuring, in addition to the yearly application of artificial fertilisers, is strongly recommended, and the crop should be ploughed under to a depth of at least 9 inches.

Liming the soil every five or six years, with about 1 ton of air-slaked lime or gypsum per acre, may also be very profitable.

### LEMONS (LIMES AND CITRONS).

Citrus fruits may be grown from one end of the State to the other, provided that the soil is suitable, and for this reason the careful selection of the soil is of the greatest importance. The soil need not be extremely rich, but must be in good mechanical condition, friable and perfectly drained, with a free, porous subsoil. The soil most suitable is a deep, sandy loam, of reddish, brownish, or chocolate colour, and fairly rich in humus and lime. Clayey subsoils must be avoided.

Lemons grow and bear well in the coastal district, but the fruit is not of a high quality, and better results are obtained inland. Limes and Citrons, however, do particularly well along our eastern seaboard.

As soon as the trees come into bearing the use of artificial fertiliser will become profitable, both in regard to quantity and quality of the fruit. It is always best if the use of artificial fertiliser is combined with application of either farmyard manure, compost, or green manure.

A standard manure for citrus fruits can be made up, in accordance with any of the following formulæ:—

3 cwt. superphosphate
1½ cwt. sulphate of potash
2 to 3½ cwt. of sulphate of ammonia or nitrolim } per acre;

or,

2 cwt. Thomas phosphate
1½ cwt. sulphate of potash
3 to 4½ cwt. dried blood } per acre;

or,

4 cwt. meatworks manure (with blood)
1½ cwt. sulphate of potash
1½ cwt. nitrate of lime or nitrate of soda } per acre.

The same quantities in pounds may be applied to trees of medium size, bearing in mind that trees about five years old require from 4 to 6 lb. of any of the above complete fertilisers, and that the amount can be increased up to 20 lb. per tree for very old large trees.

Fertilisers should be supplied regularly every year, and the manure should be well forked, chipped, or cultivated in.

In an old orchard the manure should be applied broadcast over the whole area. It is always advisable to divide the above quantities of manures into two lots, and apply one-half towards the end of winter, in July or August, and the other in December or January.

In order to allow anyone who has only a few trees to make up a dressing for each tree, a few complete fertilising mixtures are added, of which the lesser amounts ore for young trees and the large amounts for older trees:—

1.

2 to 6 lb. superphosphate
1 to 2 lb. sulphate of potash
2 to 4 lb. dried blood.

2.

2 to 6 lb. superphosphate
1 to 2 lb. sulphate of potash
1 to 3 lb. nitrolim or sulphate of ammonia.

3.

4 to 8 lb. bonedust
1 to 2 lb. sulphate of potash
2 to 4 lb. dried blood.

4.

3 to 7 lb. Thomas phosphate
1 to 2 lb. sulphate of potash
2 to 4 lb. nitrate of lime or nitrate of soda.

5.

4 to 16 lb. of a ready mixed fertiliser containing about 6 per cent. of water-soluble phosphoric acid, 10 per cent. of potash, and from 6 to 10 per cent. of nitrogen.

## MANGO.

This tree will grow in almost any soil, from a sand to a heavy loam, amongst rocks, on gravelly and on shaley soil; it will thrive best, however, on a good loamy soil, containing plenty of lime, and under tropical conditions, as it will not stand heavy frosts. Young trees benefit mostly by a good mulching with farmyard manure. Older trees may be fertilised with artificial manures, applied in holes made by driving a crowbar into the ground, at intervals all round the tree, extending from 2 to 7 or more feet from the stem. A mixed fertiliser—

3 to 6 lb. superphosphate
2 lb. sulphate of potash
1½ to 2 lb. nitrolim or sulphate of ammonia } per tree,

is distributed amongst the various holes, which are then covered or filled up with soil.

For very large trees the quantities of fertilisers may be nearly doubled.

### ORANGES.

The general remarks made on the cultivation of citrus fruits, under the heading of "Lemons," apply to oranges and mandarins.

Several of the most favoured varieties of oranges and mandarins do remarkably well on our well-drained, rich volcanic scrub soils, others again, like for instance the Seville orange, can be grown on heavier soil than that most suitable to sweet oranges.

The application of artificial fertilisers is generally very profitable, and improves both quality and quantity of the fruit; the following facts, however, have to be borne in mind. Inorganic nitrogen, as nitrogen in form of sulphate of ammonia or of nitrolim, produces a light-coloured, thin-skinned sweet fruit, which is of more particular importance in the case of Navel oranges. Organic nitrogen, nitrogen in form of blood, meatworks manure, &c., produces oranges with darker and coarser skin. Potash produces also light-coloured and thin-skinned fruits, which are inclined to be acid.

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## THE CONTROL OF WEEDS.

The "Queensland Sugar Journal," of 7th October, contains the following interesting note on the destruction of weeds amongst sugar-cane by means of a poisonous spray, contributed to the June issue of "Sugar," by Mr. W. E. Cross, Chemist to the United States Agricultural Experiment Stations:—

It appears that a series of experiments was recently carried out by the United States Department of Agriculture in co-operation with some of the State Experiment Stations, and with a number of scientific farmers.

In the first series no cultivation whatsoever was given after planting, the weeds being destroyed by a sharp hoe used horizontally, without disturbing the soil any more than absolutely necessary; in the other series the usual cultivation was practised. The average results of all the experiments showed that the plots which had only been weeded produced 95 per cent. as much fodder as that given by the cultivated plots, and 99·1 per cent. as much grain. The experiments thus appeared to show that the destruction of the weeds is the only benefit to be obtained from the cultivation of corn.

In Hawaii experimental work has led to a similar conclusion with regard to the cane crop. While this conclusion appears to be in opposition to the opinion that it is advantageous to turn over the soil between

the rows, it is to be noted that that method of cultivation invariably causes the destruction of some of the roots of the cane, and that, moreover, the lack of cultivation during the last six to eighteen months of the crop does not prevent the cane developing as rapidly during this period as during any other stage of growth.

As a result of these conclusions much attention has been given in Hawaii to studying out the best methods of destroying the weeds. The system which would appear to be the most satisfactory is that of Agee and Eckart, in which the weeds are sprayed with arsenite of soda. Two special spraying apparatus have been invented—the sled sprayer and the knapsack sprayer. The sled sprayer consists of an iron tank of about 100 litres capacity carried on a sled 3 ft. wide; it has three spray nozzles at each end, and sometimes a pressure gauge. In the case of the hand or portable sprayer, the arsenite tank is carried knapsack fashion on the back, and the spraying carried out by means of a hose.

There are two problems of importance that such a method of destroying weeds presents. The first is as to whether the addition of arsenite to the soil would have a prejudicial effect on the growth of the cane. Investigations along this line have shown that the arsenic, immediately after the application to the soil, loses its caustic properties, owing to the action of the iron and aluminium of the soil. Moreover, experiments carried out in Olaa, in which arsenic was applied to the soil between the rows at the rate of 5 lb. per acre each week for six months, showed that the arsenic had no injurious effect on the growth of the cane plant.

The second problem, as to whether the poison employed in the process damages the cane itself, has also been answered in the negative. It is true that, even with the best apparatus, small quantities of the spray cannot be prevented from coming in contact with the leaves of the young cane occasionally. But this is not a matter of importance, because it at most occasions a slight check to the cane, from which it recovers entirely within a few weeks.

It may be said that this method of weed control already has passed the experimental stage, as it has been adopted as a part of the normal field work in the extensive plantation of solution used at present is 5 lb. of arsenite to 100 gallons of Olaa. The procedure* there is as follows:—"The strength of water. It is Mr. Eckart's plan to do as much sled-spraying as possible, and to follow this, after a short interval, with a light hand-spraying to touch up the spots that may have been missed by the sleds. The cost of spraying at present is from 50 cents to 1 dollar for sled-spraying, and from 1 dollar to 1 dollar 25 cents for hand-spraying. The maximum amount of work for the sleds is 5 acres per day. The maximum for hand-spraying is a little over 1 acre."

The spraying should not be carried out during rain, but two hours after the rain the work may be started again. It has also been noticed that the middles remain clean for a much longer time after spraying

* Agee Bulletin 44 (Agricultural and Chemical Series), Hawaii.

than after the ordinary method of cultivation, so that often two sprayings are sufficient for the whole period of growth.

With respect to the economy of the new method, I may cite the following statement of a Hawaiian authority:—"By observing the proper rules and using ordinary intelligence, spraying can save a plantation in labour from 15 dollars to 30 dollars per year per acre."—Translated from "Revista Industrial of Agricole de Tucuman."

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## A NOVEL SILO.

A correspondent has a chimney length of half-inch thick iron from an old sugar-mill, with a diameter of 6 ft., and wishes to know how he can utilise it as a silo.

Mr. A. Morry, Surveyor to the Department of Agriculture and Stock, to whom the question was submitted, reports as follows:—

"The best way to utilise the chimney tube is to cut it through in the centre, thus giving two 15 ft. by 6 ft. tubes. These should be let into the ground about 12 ft., close together, leaving 3 ft. standing above the ground line.; 4 in. of good concrete (4—2—1) should then be put in the bottom of each for a floor, and well rendered so as to prevent water entering. Some water-proofing material, of which there are several kinds in the market, should be added to the concrete. A simple roof could be put over both silos, supported on bush timber, and a beam fixed over the centre of each, to which a block and pulley can be attached for convenience in emptying same. By this method, no portholes are required, nor appliances, such as elevators or blowers for loading, and the ensilage can be easily got out by means of the pulley block fixed as above stated, and attached to a light basket.

"The inside of the tubes should have two coats of cement wash before filling; and each time the silos are charged, a coat of either lime wash or cement should be given. These silos together will not hold more than 18 tons of chaffed and compressed silage."

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## THE DISCOVERY OF RADIUM IN COAL.

The "Fiji Planters' Journal" (September, 1915) takes from the "Scientific American" the following remarkable notes on the effects of a new product of coal, under the name of "lignaite," which has been discovered by two distinguished French chemists of Paris and Professor Scammell, M.S.C.I., of Hadleigh, Essex;—

By its use, it appears that radishes and other root crops are obtained nearly "five" times as large as those grown in untreated soil at the same time.

If this process could be generally adopted by our agriculturists in this country, the increase in the prosperity of the nation would be very large.

The initial cost of such a system has hitherto stood in the way of its general adoption.

But the recent discovery by MM. Detaille and Lafayaise, the two distinguished French chemists of Paris, and Professor Scammell, M.S.C.I., of Hadleigh, Essex, that coal contains radium, which, in the form of "lignaite," can be used for the radiumisation of the soil, places the process within the reach of every agriculturist in the country.

Fruits, flowers, and vegetables can be grown in a much "shorter" time, in much larger quantities, and of finer quality by the use of "lignaite," the cost of the treatment of an ordinary-sized garden being very trifling; the process is available for use by the humblest worshipper at the shrine of Flora.

Once more in the history of human progress the world is indebted to the brilliancy and originality of French scientific thought and research; and, with a view to enable the country at large to benefit by their discoveries, the eminent chemists mentioned are sending to all applicants full details of the best methods of applying the "lignaite" to the soil.

The importance of this discovery to the small landowner or cultivator is obvious; it is now possible for the man with 2 or 3 acres of ground to make a substantial profit each year, sufficient to keep his family and himself in comfort.

And this discovery—viz., medicatrix natural, the latest and most beneficent of the achievements of science—goes far to solve the land problem and pave the way for the reappearance of the sturdy peasant proprietor, the backbone of the country.

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## SEED POTATOES.

The Irish Department of Agriculture recommends not only the planting of seed potatoes whole, the size of a hen's egg, but that these should be immature, being dug before the tops have dried off. The reason given for this is that, once maturity is reached, deterioration begins to set in, the dying of the tops being an evidence of this. By lifting the tubers before that stage is reached, deterioration is arrested and the seed tubers are obtained at the time of their greatest vigour. We have often pointed out the advantages of sprouting seed potatoes before planting. (*See* Note on "Potato Planting," in the pamphlet on Market Gardening issued by this Department.) "Garden and Field" for November, 1915, says that the advantages claimed for sprouting are:—(1) It increases the yield by 25 per cent; (2) the crop matures earlier and can be lifted earlier; (3) sprouting enables planting to be done when conditions of weather and soil are most favourable, the sprouted seed being kept out of the ground for another week or two, if necessary, without detriment or actual loss of time; (4) there are fewer blanks, as no potato is planted that has not already started growth; (5) there will be less trouble from weeds, as the strong foliage developing from the sprouted seeds chokes, or, at least, checks, weeds so much that

they give very little trouble. Not more than two sprouts should be allowed to remain, and these should proceed from the rose end.

The difference in the results from sprouted and unsprouted seed was shown by an experiment made at the Queensland Agricultural College some years ago. A quantity of sprouted seed was selected from the barn, and planted; and at the same time, an equal quantity of unsprouted tubers were planted on an adjoining plot. The first lot quickly appeared above ground with scarcely a miss; the other lot came up much later, in a straggly manner, and there were about as many misses as there were plants.

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## THE PRICKLY-PEAR PEST.

The following remarks on Prickly-pear Destruction and Prickly-pear Selections appear in the last Annual Report of the Under Secretary for Lands:—

Considerable impatience has been manifested by holders of prickly-pear infested lands as to the results of Mr. O. C. Roberts' system of destroying the pear. Notwithstanding several drawbacks in the initial stages of his work, and further trouble caused by the European war, drought, &c., Mr. Roberts has made good progress in the destruction of the plants and the utilisation of the dead pear in the production of potash, and has demonstrated the effectual work of his arsenious trichloride gas system at a cost below anything yet obtained.

Pastoralists and selectors have again shown determination to deal with the clearing of their lands from prickly-pear and have done good work, the extent of which would have been increased but for the scarcity of labour for this kind of work and the droughty conditions prevailing generally.

The policy of the Department has been to encourage the selectors of prickly-pear lands as much as possible; and no forfeiture has been declared where the selector, although not strictly complying with the conditions, has shown a *bonâ fide* attempt to do so.

### *Pastoral Holdings.*

The pastoral holdings leased without any special conditions of pear destruction and subsequently notified as pear-infested number 209. Of these 72 have been freed from pear by an expenditure of £5,485; 118 have been partially freed from pear at a cost of £65,099; while in the case of 19 holdings nothing has yet been done as regards the eradication of the pear.

Of the pastoral holdings to the number of 141 leased with a special condition providing for the destruction of prickly-pear, the condition in respect of 80 has been performed to date, at a cost of £16,780, and on the remainder, though the progress does not satisfy requirements, there has been an expenditure of £37,357.

*Pear-infested Selections.*

The total number of selections standing good on the 31st December, 1914, notified as pear-infested, is 3,043. This number is exclusive of prickly-pear selections and selections of land originally opened with a special condition providing for the destruction of prickly-pear. Of this number 1,286 have been entirly freed from pear by an expenditure of £39,156; 1350 have been partially freed at a cost of £125,138; while in the case of 407 infested selections no expenditure on pear destruction has yet been reported.

Of Agricultural and Grazing Selections applied for subject to a condition of pear destruction the condition has been satisfactorily performed in 82 cases, at a cost of £2,272 12s. 6d.; while in 82 cases in which the condition has not been fully satisfied, there has been an expenditure to the amount of £5,544 4s. 11d.

*Prickly-pear Selections.*

As regards Prickly-pear Selections, the main condition of the tenure has been satisfactorily complied with in 1,675 cases, at a cost of £92,541 3s.; while in 1,118 other cases the expenditure, though not up to requirements, reached the sum of £115,845 5s. 3d.

The total recorded expenditure for the year by pastoralists and selectors in destroying prickly-pear on pastoral holdings and selections of all tenures, not including those forfeited or surrendered during the year, is £98,888 8s. 10d.

The total recorded expenditure by lessees and selectors in destroying prickly-pear on pastoral holdings and selections of all tenures to 31st December, 1914, is £505,221 7s.

*Experimental Station.*

Work at the Experimental Station, Dulacca, was continued throughout the year under the supervision of Dr. Jean White-Haney, officer in charge. Dr. White-Haney's report on the work done is a detailed report covering all the experimental work now in hand.

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## WHEAT AND MAIZE CROPS OF THE UNITED STATES OF AMERICA FOR 1915.

No nation in the history of the world ever harvested a crop remotely to be compared, either in bulk or value, with the harvest of grain and fruit which the farmers of the United States have gathered this year. A large part of it will be sold to Europe's hungry and fighting millions. Remarkable as was the crop of 1914, in itself far excelling all previous records, the reports of the experts of the Department of Agriculture, compiled and made public, show that the harvest of 1915 will exceed it in almost every particular.

The wheat harvest this fall may possibly, for the first time in the history of the country, go above 1,000,000,000 bushels. Experts on prices

calculate this crop will stand the country in about 1,135,100,000 dollars (£227,020,000). The farmers are expected to put 960,000,000 dollars (£192,000,000) of this directly into their own pockets. The increase in the wheat crop is practically entirely due to the increased acreage under cultivation this year. The average yield per acre is slightly below that of last year, being put at 16·3 bushels to the acre. The maize crop, like the wheat, is threatening to pass another memorable mark, by turning out 3,000,000,000 bushels, the estimate now being 2,918,000,000 bushels. This is an increase over last year's yield of 245,000,000 bushels.

The expansion of the corn crop is due at once to an increased acreage under cultivation, and to a better yield per acre. This crop will probably represent close on three-fourths of the world's total production. The oat crop, the third of the three great leaders, has increased over last year's record, by nearly 25 per cent., the figures being—For this year, 1,402,000,000 bushels; for last year, 1,141,000,000 bushels. The year's barley crop will, it is estimated, amount to 217,000,000 bushels, or 22,000,000 bushels more than last year; the rye crop has been increased from 43,000,000 bushels to 44,000,000 bushels; the rice crop from 24,000,000 bushels to 30,000,000 bushels; 18,000,000 bushels of buckwheat have been raised, against 17,000,000 in 1914.

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## POTATO-GROWING IN CENTRAL QUEENSLAND.

Writing on 4th November, Mr. J. Newman, a successful farmer at Scrubby Creek, in the Rockhampton District, gives the following advice to potato growers:—

"The Potato (*Solanum tuberosum*), which takes second place only to the cereals as a food-producing plant, has, at the time of writing, become something of a luxury, as new potatoes are now selling in Rockhampton at £1 per cwt., and are being retailed there at 3d. per lb.

"Potato-growers are now busy harvesting and marketing their summer crop, which, in some localities, is turning out fairly well—all grown by irrigation.

"As this is the only crop in the year from which sets can be saved for the next planting (February-March), I give the result of my experience in the matter of keeping them, which is a somewhat difficult, and often disappointing business.

"The potato moth and its larvæ are, in nine cases out of ten, responsible for the destruction of seed potatoes in this district, and the old way of throwing the tubers in a heap, possibly on the ground, in some corner of the barn, and covering them with straw or bags, is simply courting disaster.

"For the February-March planting, sets are best planted whole on account of the great heat and moisture in the soil.

"Select your sets not less than 1½ in. in diameter, and fill into bags, and, as you fill in, dredge over them lightly a mixture of 1 lb. of black pepper, and one tin of insectibane, thoroughly mixed.

"Should any larvæ which may be in the tubers hatch out, they will be immediately asphyxiated, and any moths or other insects entering from outside will share the same fate.

"Set the bags on end on a boarded floor in a cool and dry place in the shed, and, once a month thereafter, turn all out and examine them; then, after discarding any bad ones, re-bag, sifting in a little more of the insectibane and pepper mixture.

"As planting time approaches it will be found that they have become somewhat shrivelled, and can be compressed between the finger and thumb like indiarubber; this is no detriment to them, as, after being planted, they will quickly absorb from the soil the water which the tropical atmosphere has extracted from them.

"Scrub land is the soil *par excellence* for this crop, and I know such land which has produced heavy crops twice a year by irrigation for the last twenty years, and is still doing it.

"The February-March planting is dug in May and June, and, as the winter planting commences in July, the farmer has a busy time. The July planting is a more simple matter, as the land is generally cool and moist, and in these conditions large potatoes may be used by cutting them into pieces, each bearing one or two eyes.

"The seed for this planting is imported from the South, and just here I would caution the grower against the Potato Blight (*Phytaphthora infestans*). I have seen it in seed imported from Sydney, and when planted I have seen the black spot on the leaf indicating its presence; but this was some years ago, and I believe the climate here is too dry for the disease ever to become a meance to our crops.

"To grow potatoes here farmers must have some kind of irrigation plant. Oil engines are not expensive, and my experience is that farmers never pay for them, because they pay for themselves, and, in addition, they pay to the farmer many times their own cost in clear profit in a few years."

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## AGRICULTURAL NOTES—THE LOCKYER DISTRICT.

By CUTHBERT POTTS, Principal of the Queensland Agricultural College.

Since my arrival at the College at the end of September, weather conditions have been extremely unfavourable; but it is at such a time as this that small variations in field practice show the most pronounced differences in results. Consequently, we are able to draw certain conclusions which should be of considerable value in subsequent years.

*Hay Crops.*—In regard to all these crops the time of planting was most striking; but even more pronounced was the time of ploughing. In one of the paddocks a portion was ploughed in December and January, and planted with wheat, skinless barley, and oats early in May. Another portion was ploughed in March, and after good rains. Part of this was planted with barley and peas on 15th July; while the rest of this area, together with land which was ploughed in June, was planted with oats on 16th July. The early-planted oats, wheat, and

barley on the early-ploughed areas all did well. The barley and peas on the March-ploughed land did fairly well; while the oats, which were planted over an area partly ploughed in March and partly in June, gave an indifferent crop on the March-ploughed area and no crops on the June-ploughed portion. These results, obtained inside the confines of one single paddock, are very significant. Undoubtedly the good yields obtained on a portion of the area were due to the early ploughing, which gave the land a few months' fallow, and thus the surface was open and loose for the ready intake of rain; but the results must be partly attributed to the early planting.

Thus, in this district, where dry springs are the normal condition, and where excessively dry times occasionally occur, there seems every indication that early ploughing and early planting for hay crops is good practice.

A word of caution is required to prevent disappointment. In exceptionally good years a system of fallow may prove slightly more expensive than late ploughings, and in normal years there may be nothing very pronounced in its favour; but in an exceptionally dry season, such as this, the advantage gained in one year will more than compensate for more than ten to twenty years of slightly varying results. It is the average of years that tells—not the speculation on a single season.

*Lucerne.*—Being faced with every indication of an excessively dry spring and shortage of grass and fodder, 50 acres of lucerne were cultivated with a spring-tooth harrow early in October. The object was to conserve as much soil moisture as possible, and thus get some growth on which to graze horses and sheep. The result was so successful that a lucerne renovator was procured (there are several good makes on the market), and another 100 acres of lucerne cultivated. In every case, the cultivated areas have shown a marked improvement in growth; and up to the present we have succeeded in keeping some forty young horses and 400 lambs in good condition and growing well. Had this cultivation been done in the late autumn instead of the early spring, the results should have been much better for two reasons:—

(1) In autumn one is familiar with the heavy dews that form. This dew is not moisture from the air which has condensed and fallen to the soil, but instead, it is part of the moisture which, rising from the warm soil into the cooler air, has condensed and fallen to the surface of the land. Dews, then, are an indication of the rate at which the soil is losing moisture, and cultivation will check this loss;

(2) With a loose surface, the soil will take in any rain that may fall more rapidly and more deeply.

Coupling these together, late autumn cultivation of lucerne should undoubtedly pay for itself in such times as these.

*Pigs.*—Prime pigs are selling at exceptionally high prices at present. Lately we marketed three pigs of average live weight of 170 lb., and

netted a return of £7 10s. each, or something over 10d. per lb. live weight. Certainly, these are abnormal prices; but even at half these rates pigs would pay.

Where lucerne can be so successfully grown as in the Lockyer Valley, pigs, if properly managed, should be amongst the surest and quickest sources of income.

With arrangements for the young pigs to graze on lucerne, or even to be fed with lucerne hay in racks, and finally fattened on home-grown maize, root crops, green barley, sweet potatoes, &c., pig-raising should be a very attractive enterprise. This is especially so as there is every indication that pork will remain up in price, while pig-raising offers one of the quickest ways of recovering from the effects of the present drought.

*Water Conservation.*—In this district probably the greatest problem is the supply of water for stock. Several wells that have been sunk have obtained water far too alkaline for stock use; and this seems to be a usual occurrence in the higher and more sandy portions of the valley. Furthermore, the upper reaches of the Lockyer Creek have ceased running. Consequently there seems only one course open, and that is the conservation of surface waters. The first step in this direction is a series of weirs on the Lockyer Creek, which would ensure a good supply of water for stock and possibly for irrigation.

Reporting on the Oat crops at the College, Mr. C. S. Clydesdale shows the following results:—

## CALCUTTA OATS.

These oats were imported from F. H. Brunning, Melbourne, by the Department of Agriculture, and forwarded to the Queensland Agricultural College for trial.

The results have been remarkably good, considering the weather conditions under which they were grown.

The following gives the rainfall from the months they were sown until harvesting:—

| | Points. |
|---|---|
| May .. .. .. .. .. .. | 196 |
| June .. .. .. .. .. .. | 5 |
| July .. .. .. .. .. .. | 125 |
| August .. .. .. .. .. .. | 162 |
| September .. .. .. .. .. .. | 112 |
| Total .. .. .. .. .. .. | 600 |

This is the first time that these oats have been grown in this district, and have proved a success. Of course, this being the first year of trial, it does not imply that they are always going to be a success; but it is intended to save all seed and go on with further trials.

The land was prepared during the months of December and January, the area sown being 5 acres 3 roods.

The sowing commenced on the 11th May, 1915; planting 1½ bushels of seed per acre, using the ordinary seed drill.

The oats came through nicely and made excellent growth, stooling out well, growing to a height of 4 ft.; nice and fine in straw, with a large amount of flag; thus much resembling the Sixty-day Oat. It is apt to lodge a little, but nothing to prevent the use of the reaper and binder. There was little or no rust. Carter's Improved Tartarian oats, grown under identical conditions and alongside the Calcutta oats, were affected with rust.

These oats have proved the best with us this season, although we had some eleven varieties growing.

The oats were allowed to go to seed. Harvesting was commenced on the 29th September, giving a total yield of 11 tons, which works out at 1 ton 18 cwt. 1 qr. per acre.

They are not threshed out yet, but it is expected that there will be somewhere about 50 bags or 150 bushels.

## VARIETY TRIALS.

### *Oats.*

There were nine varieties of oats imported from New Zealand and Scotland, and experiments were carried out with these in 1½-acre plots. The following are the names:—New Zealand varieties: Twentieth Century, Golden Rein, American Banner, New Kerson, Great Mogul. Scotland varieties: Leader, Mounted Police, Beserkers, Prolific, Record.

The land was twice ploughed, twice harrowed, and three times disc cultivated, and was in excellent order. The sowing was commenced on 18th May, 1915; and 1½ bushels of seed per acre were sown with the ordinary seed drill. The land was rolled after sowing.

The following table will give fuller particulars:—

| Name of Variety. | Area | Imported From. | Quantity of Seed per Acre. | When Sown. | When Up. | Coming in Ear. | When Harvested. | Field. | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Hay. | Hay saved for Feed. |
| | acre. | | | | | | | T. C. Q. | C. A. |
| Twentieth Century | 1 | New Zealand | 1½ B | 18-5-15 | 27-5-15 | 4-10-15 | 21-10-15 | 1 0 0 | 6 0 |
| Golden Rein ... | 1 | New Zealand | 1½ B | 18-5-15 | 27-5-15 | 4-10-15 | 21-10-15 | 1 17 0 | ... |
| American Banner | 1 | New Zealand | 1½ B | 18-5-15 | 27-5-15 | 2-10-15 | 21-10-15 | 1 9 0 | ... |
| New Kerson ... | 1 | New Zealand | 1½ B | 19-5-15 | 27-5-15 | 7-9-15 | 9-10-15 | 1 4 0 | 5 0 |
| *Great Mogul ... | 1 | New Zealand | 1½ B | 19-5-15 | 27-5-15 | .... | .... | 5 0 0 | ... |
| *Leader ... ... | ½ | Scotland ... | 1½ B | 19-5-15 | 27-5-15 | ... | ... | 1 17 2 | ... |
| Mounted Police ... | ½ | Scotland ... | 1½ B | 19-5-15 | 27-5-15 | 21-10-15 | 11-10-15 | 0 15 0 | ... |
| Beserker's Prolific | ½ | Scotland ... | 1½ B | 19-5-15 | 27-5-15 | 21-10-15 | 11-10-15 | 0 17 0 | ... |
| Record ... ... | ½ | Scotland ... | 1½ B | 19-5-15 | 27-5-15 | 21-10-15 | 11-10-15 | 1 3 0 | ... |

* Green feed.

The weights shown in the above table are not from areas as given. An experiment of feeding down the varieties was tried.

On 20th July the whole area was divided in halves by sheep hurdles, and the sheep turned in and allowed to graze. This portion of the plots proved a failure, only growing about 6 in., and then coming into ear; so it can be reckoned as half-acre in place of acre-plots, and quarter-acre in place of half-acre plots.

These oats did fairly well considering the weather conditions, but were very coarse, and had suffered considerably from the ravages of rust, smut, and caterpillars. All varieties had a large amount of flag, and in some instances were apt to lodge. Having only small quantities of the original seed, it was found necessary to save a small portion of two varieties for further trials.

The best of all of these varieties was New Kerson, which was the earliest, and was not so coarse in the straw.

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## BY-PRODUCTS OF A COTTON CROP.

Owing to the want of experience as to the value of the by-products of a cotton crop, ginners, in the halcyon days of cotton-growing in Queensland, threw away thousands of pounds sterling annually. Cotton seed, after passing through the gins, carries a certain amount of short fibre which is not removed by either the saw or roller-gin, and was looked upon as valueless. The American cotton-ginners, on the other hand, very soon discovered that there was money in this so-called refuse, which goes by the name of "linters"; and they invented a special gin with which to recover it. This gin has two saws closely set which take off the smallest fibres adhering to the seed, thus recovering from 46 to 72 lb. of fibre per ton of seed, which readily sells at £3 per ton. During the process, these linters pass into a condenser, and then through rollers on to a steel core, which revolves slowly and winds off the lint in the form of a compressed bat, about 1 in. in thickness, forming it into a cylindrical roll, when it is ready for market.

A well-grown crop of Uplands cotton will, in a fair season, return from 1,000 to 2,000 lb. of seed cotton per acre, and 1,000 lb. of this contains about 600 lb. of seed. Thus, roughly, 100 tons would give about 53 tons of seed, the linters from which would amount to 2,650 lb., or, approximately, 1 ton 4 cwt., which, at £3 per ton, would be worth £3 12s. Now, as to the other by-products. The re-ginned seed is run through machines which separate the hulls from the kernels. One ton of kernels will yield near half-a-ton of hulls worth 12s. 6d. per 600 lb. of seed. Next, we have the oil. The kernels, after being hulled, yield 30 per cent. of their weight in the shape of oil. The 300 lb. of kernels, which constitute one-half of the weight of the seed, yield 12 gallons of oil, or about 90 lb., worth 20s. per cwt. in its crude state, or about 16s. for the 12 gallons. And there is yet another by-product of value—the oil-cake, which represents 210 lb. At the low price of £5 per ton, these 210 lb. are worth nearly 10s. (Since the war, prices for these products are much higher.)

The hulls, mixed with cotton-seed meal, form a superior food for stock for which there is a steady demand for the whole supply. In

the United States of America the value of the cotton-seed oil amounts to nearly £4,000,000, and of the cake to £2,500,000 annually; and Queensland ginneries thus threw away during the progress of the American civil war, something like £120,000, the value of the by-products of 26,000,000 lb. of cotton lint which alone brought £1,300,000 in the Liverpool markets.

# MARKET GARDENING.

## PRODUCE OF A SMALL VEGETABLE GARDEN.

As showing what can be done in the way of raising vegetables on a small suburban allotment, given a fair supply of manure, a compost heap, and a good water supply, we have received the following particulars from a resident of the suburb of Milton. The soil (he states) is very gravelly and overlies stiff red clay, and has been under cultivation for over fifteen years.

Between 5th September and 6th November (about nine weeks), the following quantities of vegetables were obtained (Jerusalem artichokes from the previous season left over until October) :—

Cauliflowers, 2 dozen; cabbages, 3 dozen; parsnips, 24 bunches; carrots, 26 bunches; turnips, 10 bunches; lettuce, 3 dozen; beetroots, 15 bunches; mustard and cress, 20 bunches; parsley and mint, 6 bunches; tomatoes, 10 lb.; Jerusalem artichokes, 20 lb.; broad beans (a failure), 2 lb.

*Fruit.*—Papaws, 126; peaches, 30 dozen; grapes (1914), 110 lb.; coffee, 10 lb. (parchment, which was roasted and ground at a Brisbane establishment); apples, Rome Beauty, 3 dozen; passion fruit (now ripening); papaws coming on but being attacked by flying foxes; coffee, ripe; apples, a fair crop set; grapes, a good crop well advanced.

The whole of the garden has been again well dug and manured, and crops of cucumbers, squashes, Lima and Kentucky Wonder beans, tomatoes, carrots, parsnips, Jerusalem artichokes, sown, some of which were in flower in November.

The garden contains about $2\frac{1}{3}$ perches, not including the space allotted to fruit-growing. The owner reckons he saves more than 1s. a day by growing his own vegetables, instead of buying them. The labour is done entirely by himself before and after business hours.

## ECONOMY IN FOOD.

The Journal of the Board of Agriculture, London, gives the following sensible advice, which dwellers in even cities in Queensland can carry out without much trouble. With a town supply of water, much money can be saved by growing vegetables and keeping fowls. We, ourselves, have kept up a supply of vegetables during the present dry time and high prices for vegetables, for the past five months, and the supply still continues. The Board of Agriculture makes an appeal to country people and to town dwellers who have a bit of garden ground. It says:—

"*Everyone*, who lives in the country and has a garden, can produce *something* to eat—the more the better: vegetables, fruit, poultry, eggs, milk, cheese. Plant at once what you can, and prepare in all possible ways for next year's cropping! Every plant in your garden may save you money! Produce all you can; buy as little as possible! Cultivate thoroughly! Destroy insect pests and weeds! Prepare manure! Preserve and store your crops with the greatest care! The finest harvesting may be rendered useless by bad storing. Protect from the weather! Destroy vermin! Store your own vegetables! Bottle your fruit or make jam or pulp of it! Preserve your eggs when abundant! Cure your own bacon! Eat little meat! Replace meat by milk, cheese, peas, beans, and lentils, which are as rich in flesh-formers as meat, and much cheaper. Use more vegetables! Eat more fruit! Bake your own bread: it will be cheaper and better! Use whole-meal flour from home-grown wheat, barley, and oats. Good, wholesome bread can be made from:—(1) Household flour, or whole-meal flour; (2) ½ household flour and ½ barley-meal; (3) ⅞ whole-meal flour and ⅛ fine oatmeal; (4) ⅘ whole-meal flour and ⅕ maize meal; (5) ¾ household flour and ¼ boiled potatoes; (6) oatmeal; (7) barley meal. Cook vegetables by steaming! Boiling in water reduces their food value! Cook potatoes in their skins! Waste nothing! Buy nothing from abroad that can be produced at home!"

"Next year's cropping" does not affect the Queensland market gardener. With a plentiful supply of water and manure, there is not a month in the year during which vegetables of some description cannot be grown.

The following list of vegetables which may be planted each month, where climatic conditions are favourable, will show what may be done even on a 16-perch allotment:—

January.—French beans, brocoli, cabbage, carrots, celery, cress, lettuce, endive, peas, parsnips, radish, turnips.

February.—About the same crops, and potatoes.

March.—Onions, cabbages, potatoes, beans, beet, &c.

April.—Same as previous month.

May.—Transplant onions, cabbages, and rhubarb.

June.—Rhubarb, strawberries, cabbage, cauliflower, lettuce, peas, watercress.

July.—Asparagus, cauliflower, carrots, spinach, beans, onions, &c.

August.—Peas, beet, cucumber, tomatoes, Jerusalem artichokes, pumpkins, cabbage, cauliflower, parsnip, radish, carrot, potatoes, maize.

September.—French and English beans, Lima beans, beet, parsley, lettuce, egg plant, cucumbers, melons, pumpkins, vegetable marrows, squashes, carrots, parsnips, tomatoes.

October.—It is not advisable to sow cabbage this month, owing to trouble with the fly; but all the above and rosella seed may be planted.

November.—French beans, melons, brocoli, cress, cucumbers, lettuce, rosella, pumpkins, &c.

December.—The same as for January.

# Pastoral.

## DESTRUCTION OF PRICKLY-PEAR BY THE COCHINEAL INSECT.

The Under Secretary for Lands (Mr. G. Graham), when discussing the prickly-pear question last month, said:—"The cochineal insect is doing such wonderful work in the destruction of prickly-pear that people in the Charters Towers district are fearing that it will kill all the pear and leave them without any to burn and feed their stock with while the dry weather remains."

The cochineal insect was brought from Colombo, Ceylon, on the Orvieto in February, 1913, by the Prickly-pear Travelling Commission, and was placed on a bad patch of pear at Sandy Creek, in the vicinity of Charters Towers. The insect has done really wonderful work in the eradication of the pest, and the success realised has been beyond all expectations.

Mr. Graham has issued instructions to the Land Commissioner at Charters Towers to put up notices that any persons destroying the cochineal insect on pear on Crown land will be prosecuted.

The "Tropical Agriculturist," Ceylon, writing on this subject in that Journal in September, 1915, recalls that, in January, 1913, Dr. T. H. Johnston, Lecturer in Biology at the University of Queensland, and Mr. Henry Tryon, Government Entomologist and Vegetable Pathologist of Queensland, visited Peradeniya to inquire into means used to destroy the prickly-pear. They discovered at Matara the Ceylon Wild Cochineal Insect (*Coccus indicus*) feeding on some Prickly-pear (*Opuntia monocantha*), which the inhabitants stated used to exist in great quantity, but for some reason which they could not explain was disappearing. They procured specimens of the plant and parasite, and a little breeding farm was established at Henaratgoda. At the same time, the Northern Province Prickly-pear (*Opuntia dillenii*) was also planted. The insects established themselves on *Opuntia monocantha*, and two boxes of plants carrying a quantity of the scale were despatched to Brisbane early in 1914. At the time of writing the little patch of *Opuntia monocantha* has been almost exterminated by the parasite, but all efforts to establish it on *Opuntia dillenii* have proved unavailing.—"Annual Report of the Director of Agriculture, Ceylon, 1914."

## CARAWAY SEEDS.

The seed should be sown in the autumn in drills 1 ft. apart. The plants, when strong enough, are to be thinned out to 8 in. apart in the rows. The land will require an occasional hoeing and cultivation to ensure a satisfactory crop, which will be produced in the following summer. The seed may be obtained from Messrs. E. and H. Hackett, Rundle street, Adelaide. It is usually sold at 6d. and 1s. per packet.

# Dairying.

## THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF OCTOBER, 1915.

| Name of Cow. | Breed. | Date of Calving. | Total Milk. | Test. | Commercial Butter. | Remarks. |
|---|---|---|---|---|---|---|
| | | | Lb. | % | Lb. | |
| Miss Melba | Holstein ... ... | 30 Sept., 1915 | 1,035 | 3·5 | 42·30 | |
| Sweet Meadows | Jersey ... ... | 28 Sept. ,, | 578 | 5·4 | 36·89 | |
| Miss Edition | ,, ... ... | 27 Sept. ,, | 774 | 4·0 | 36·34 | |
| Gretchen ... | Holstein ... ... | 16 Aug. ,, | 968 | 3·0 | 33·79 | |
| Miss Lark ... | Ayrshire ... ... | 8 Sept. ,, | 738 | 3·5 | 30·21 | |
| Iron Plate ... | Jersey ... ... | 21 Feb. ,, | 468 | 5·4 | 29·88 | |
| Mischief ... | Ayrshire ... ... | 27 Sept. ,, | 798 | 3·2 | 29·78 | |
| Rosebud II. | ,, ... ... | 11 Oct. ,, | 671 | 3·7 | 29·08 | |
| Windyhill Davidina | ,, ... ... | 21 Aug. ,, | 649 | 3·3 | 28·86 | |
| Bluebell ... | Jersey ... ... | 20 June ,, | 574 | 4·2 | 28·83 | |
| Sylvia ... | Shorthorn ... | 25 Aug. ,, | 666 | 3·6 | 28·08 | |
| Lady Margaret | Ayrshire ... ... | 14 Oct. ,, | 594 | 4·0 | 27·89 | |
| Noble Dot ... | Jersey ... ... | 2 May ,, | 478 | 4·9 | 27·62 | |
| Lady Twylish | ,, ... ... | 5 June ,, | 494 | 4·7 | 26·02 | |
| Lennie ... | Ayrshire ... ... | 23 July ,, | 654 | 3·4 | 25·97 | |
| Lady Dorset | ,, ... ... | 10 Aug. ,, | 567 | 3·4 | 22·52 | |
| Lady May ... | ,, ... ... | 7 Mar. ,, | 497 | 3·8 | 22·13 | |
| Pauline ... | Shorthorn... ... | 17 Sept. ,, | 620 | 3·0 | 21·64 | |
| Laurette ... | Ayrshire ... ... | 9 Oct. ,, | 582 | 3·2 | 21·62 | |
| Netherton Belle | ,, ... ... | 23 April ,, | 433 | 4·2 | 21·37 | |
| Miss Belle ... | Jersey ... ... | 2 July ,, | 368 | 4·9 | 21·26 | |
| Lilia ... | Ayrshire ... ... | 19 Aug. ,, | 606 | 3·0 | 21·15 | |
| Nellie II. ... | Shorthorn... .. | 20 July, 1914 | 510 | 3·4 | 20·26 | |

From 1st to 20th October the cows received a ration of 35 lb. panicum ensilage daily, in addition to natural pasture; from 21st to 31st October they grazed on lucerne and wheat paddocks.

## ADVICE TO PIG-BREEDERS.

The Department of Agriculture and Technical Instruction for Ireland consider that the following opinions expressed by the Committee on the Irish Pig Breeding Industry cannot be too widely known:—

1. The numbers of pigs in countries which export bacon to Great Britain are falling off, and it may be anticipated that, in consequence, exports of bacon will shrink, and that Irish bacon will be in great demand. The number of pigs in Ireland should, therefore, be increased.

2. It is not necessary to cook meals for pigs. Steep the meals in cold water and feed raw; just as good results will be obtained, and labour and fuel will be saved.

3. About 5 cwt. meal will produce 1 cwt. pork.

   Given in conjunction with other foods—About 4 lb. potatoes equal 1 lb. meal in feeding value; about 6 lb. separated milk equal 1 lb. meal in feeding value.

   Separated milk given with meal and potatoes is now worth 2d. per gallon.

4. Farmers should breed the pigs they fatten, and thus secure the profit of both breeder and feeder.

5. More home-grown foods should be procured for feeding to pigs. Barley, oats, and potatoes are most suitable.

The Department learn that some farmers have used cod-liver oil in the food for pigs. This is a most undesirable practice, as the oil imparts an objectionable, fishy flavour to the pork.

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## "OVERRUN" IN BUTTER-MAKING.

The term "overrun," which is so puzzling to many of our dairy farmers, is thus explained by "Hoard's Dairyman":—Butter is composed of fat, water, salt, casein, a little milk sugar, and ash. The supplier is paid for his milk or cream according to its fat test; but since water, salt, casein, milk sugar, and ash are added to it, more pounds of butter are made than there are pounds of fat received from the farmer. The difference between the fat deliverd to the creamery and the butter made constitutes the overrun, which amounts to 18 per cent. with whole milk and 20 per cent. with cream. In other words, this overrun is made up of water, salt, casein, milk sugar, and ash. In average butter there are about 83 lb. of fat in 100 lb. of butter; in other words, 17 lb. constitute the overrun. Of course an allowance is made for this in the O'Callaghan chart on which most of our factories work.

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## THE EFFECT OF CANE-TOP FODDER ON THE CONSISTENCY OF BUTTER.

As a result of feeding sugar-cane tops to dairy cattle in Barbados, the statement is definitely made by at least one dairyman, that the consistency of the butter produced is adversely affected as soon as the cows are fed on cane tops.

Cane tops are the most readily available green fodder on certain estates for a considerable part of the year, and would seem to be a food eminently suited to the production of milk and butter. It is found, however, that a diet of sugar-cane tops results in the production of a soft butter without grain. This is an undesirable quality, and, in addition, such butter is more difficult to work and to free from the butter-milk.

It would be interesting and useful to have the results of experience in other tropical localities with regard to the feeding of sugar-cane tops to dairy cattle.—"Agricultural News," Barbados.

# The Horse.

## SKIN DISEASES OF HORSES.

"Veterinarius" writes on the subject in the "Live Stock Journal," London:—

The prevalence of skin diseases of a parasitic nature can be accounted for by the greater movements of horses during the year of war than at any previous period in our history, not excepting the time when so many thousands of horses were exported to South Africa. Then we drew upon almost every country with horses to spare, and large numbers were purchased from our present enemies, the Hungarians. For many years past it has been all a part of the German bluff to make us believe that veterinary science and sanitary science and police had been so well developed and in advance of ourselves that infectious diseases were better managed and almost non-existent in the German Empire, and that the means of diagnosis and the successful treatment were in that region of the world so much better understood that we could alone be successful by copying their methods *and purchasing their products*. The journals devoted to pharmacy in this country and the interests of pharmacists had begun, nay even dared, to utter their suspicions that all was not well with us in buying German proprietary articles when we might have produced at much less cost curative substances of equal or greater value. The thoroughness of the plan was as great as that by which the bottle and other trades were captured from us—but that is another story.

Skin diseases on the Continent of Europe, like swine fever and other infectious maladies, have always been more prevalent and less under control than in these Islands, and yet—and yet—our own professors and teachers bowed the knee in reverence to things German and forsook the well-tried home products for the hybrid and synthetically produced foreign proprietary articles protected by their names and trade-marks, and "made in Germany" was a recommendation when it should have been a warning.

Mange was prevalent in the early months of the year, both psoroptic and symbiotic, while the more virulent type, known as sarcoptic, was by no means rare. Seasonal influences are great, just as in one year flights of ladybirds afford much pleasure to children and the next year hardly any are to be seen. If the ordinary rules of reproduction applied to parasites, there would be an increased number in the year following a prolific one, but such is not the case. Some at present unknown factor militates against the further propagation of an infectious disease just at a time when it seems to have developed an invincibility. If this were not so, then the world's inhabitants would be destroyed by parasites. It is perhaps not generally known that the less virulent types of mange never die out in the stables and byres of those farmers who leave everything to the "Nature cure," which is such an easy way of avoiding trouble and expense for the time, but usually has to be paid for dearly at some future period. The stalled ox and the poor cow during winter—

the late months more especially—develop wrinkles on the neck and baldness about the root of the tail as the result of symbiotic mange mites. This trouble is accepted as a matter of course, because it is quite usual with a certain class of owner, and they would be surprised if told that the trouble was caused by mites, and could be prevented or cured at the beginning of the winter by cheap and efficient dressings.

Another example of mange which is localised and not suspected is that which causes horses of the Shire type to spoil their feather by rubbing one leg over the other. A symbiot is at work, causing an irritation for his own profit. He is not a borer, who can pierce the skin for the nutriment he requires, and is for the most part quiescent when the horse is out of doors, but at night, or when the farm horses are standing in the stall, he combines with his fellows in a march across country, so to speak, and this trampling of myriad little feet causes itching. The host stamps and rubs; the abrasions caused by the shoe or opposite hoof give off serum or a fluid of the kind upon which these parasites feed. Thus they accomplish their object at the expense of their host without any special effort of their own. Their presence, as in the cattle form previously mentioned, is not so much as suspected by the farmer, who generally thinks a horse is disposed to have grease if he stamps and rubs in the stable at night. He does not know that this annoying, sleep-disturbing, and disfiguring malady can be easily cured, but he purchases grease-balls, and gives nitre and sulphur or other remedies to act upon the kidneys, which have nothing to do with the trouble.

The diagnosis is not difficult, and if the owner is in doubt he will not do wrong in following the directions given below.

Plaster thickly with soft soap the whole of the affected area and some few inches beyond it. Leave the soap on all night, and in the morning wash the parts with plenty of warm water. *Warm* we have said advisedly, and we do not mean *hot* water. for it has yet to be generally known that the thick skin of the bullock and the horse is more easily scalded than the thin skin of the cook or the insensitive hand of the manual labourer. The soap does not kill the mites. It prepares the way. It causes the outer layer of the skin to swell up and become loosened, so that the parasiticide or killer to follow comes into contact with all that would otherwise lurk in security and in sufficient numbers to reproduce and repopulate the affected region. There is a wide choice of destroyers, and most of the popular disinfectants of 5 per cent. strength prove effective. All the coal tar series can be relied on, and there is no objection to their employment, save that a certain amount of resin is present, and this inclines to mat the feather on a Shire. For such we may use a similar strength of chloride of zinc in water or tobacco juice which can be purchased of horticultural supply merchants. It does not pay duty, and is cheap. If only a small quantity is needed, we may use 1 oz. of common shag tobacco to the pint of water, or if very fully convinced of the importance of national economy the heel taps from our pipes may be infused in boiling water.

[The above is corroborated by Mr. McGown, Veterinary Surgeon to the Department of Agriculture and Stock, Queensland.—Ed. "Q.A.J."]

# Poultry.

## REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, OCTOBER, 1915.

Seven thousand six hundred and thirty eggs were laid during the month, an average of nearly 144 per pen. This is a fine performance, but, if the present hot dry weather continues, the laying is sure to fall off, as our green feed is just about finished. C. E. Bertelsmeier's White Leghorns win the monthly prize with 164 eggs. The following are the individual records:—

| Competitors. | Breed. | Oct. | Total. |
|---|---|---|---|
| Jas. McKay | White Leghorns | 130 | 908 |
| C. E. Bertelsmeier, S.A. | Do. | 164 | 900 |
| J. Gosley | Do. | 142 | 886 |
| Mrs. Munro | Do. | 144 | 884 |
| Mrs. J. Jobling, N.S.W. | Black Orpingtons | 114 | 878 |
| J. D. Nicholson, N.S.W. | White Leghorns | 148 | 868 |
| A. W. Bailey | Do. | 151 | 863 |
| J. M. Manson | Black Orpingtons | 146 | 861 |
| Kelvin Poultry Farm | White Leghorns | 152 | 860 |
| A. H. Padman, S.A. | Do. | 159 | 855 |
| S. E. Sharpe | Do. | 138 | 853 |
| J. R. Wilson | Do. | 153 | 853 |
| E. F. Dennis | Do. | 155 | 853 |
| King and Watson, N.S.W. | Do. | 148 | 838 |
| J. M. Manson | Do. | 159 | 822 |
| A. T. Coomber | Do. | 150 | 814 |
| O.K. Poultry Farm | Do. | 160 | 814 |
| C. T. Clark | Do. | 138 | 809 |
| T. Fanning | Black Orpingtons | 140 | 808 |
| E. A. Smith | White Leghorns | 154 | 801 |
| H. Hammill, N.S.W. | Do. | 139 | 800 |
| E. Le Breton | Do. | 131 | 798 |
| E. V. Bennett, S.A. | Do. | 146 | 795 |
| C. Knoblauch | Do. | 147 | 794 |
| W. Parker | Do. | 156 | 789 |
| W. Purvis, S.A. | Do. | 151 | 788 |
| R. Burns | Black Orpingtons | 144 | 786 |
| T. Fanning | White Leghorns | 143 | 783 |
| F. Clayton, N.S.W. | Do. | 149 | 777 |
| Cowan Bros., N.S.W. | Do. | 151 | 773 |
| R. Jobling, N.S.W. | Do. | 146 | 772 |
| W. Meneely | Black Orpingtons | 133 | 766 |
| R. Burns | S. L. Wyandottes | 140 | 757 |
| Moritz Bros., S.A. | White Leghorns | 143 | 757 |
| Geo. Tomlinson | Do. | 125 | 757 |
| Cowan Bros., N.S.W. | Black Orpingtons | 144 | 755 |
| W. Lindus, N.S.W. | White Leghorns | 148 | 752 |
| Derrylin Poultry Farm | Do. | 145 | 752 |
| E. A. Smith | Black Orpingtons | 157 | 742 |
| Wm. Lyell | White Leghorns | 139 | 739 |
| R. Jobling, N.S.W. | S. L. Wyandottes | 120 | 736 |

| Competitors. | Breed. | Oct. | Total. |
|---|---|---|---|
| J. Zahl ... ... ... ... ... | White Leghorns (No. 1) | 151 | 723 |
| G. H. Turner ... ... ... ... | Do. ... ... | 137 | 711 |
| J. H. Gill, Victoria ... ... ... | Do. ... ... | 160 | 709 |
| J. G. Richter ... ... ... ... | Do. ... ... | 146 | 709 |
| J. Aitchison ... ... ... ... | Do. ... ... | 137 | 706 |
| J. Zahl ... ... ... ... ... | Do. (No. 2) | 127 | 683 |
| Loloma Poultry Farm, N.S.W. ... | Rhode Island Reds ... | 145 | 685 |
| E. Pocock ... ... ... ... ... | White Leghorns ... | 144 | 668 |
| F. Clayton, N.S.W. ... ... ... | Rhode Island Reds ... | 143 | 604 |
| S. Chapman ... ... ... ... | Brown Leghorns ... | 132 | 590 |
| W. H. Forsyth, N.S.W. ... ... | White Leghorns ... | 145 | 579 |
| J. R. Johnstone ... ... ... ... | Plymouth Rocks ... | 121 | 438 |
| Totals ... ... ... ... | ... | 7,630 | 41,001 |

# State Farms.

## STATE FARM, BUNGEWORGORAI.

The Manager reports for the month of October that dry conditions have prevailed, only 16 points of rain having been recorded, making a total of 520 points for 1915.

The temperature recorded averaged 89·9 degrees Fahr.

As regards the wheat crops, these were very light, but it was hoped that sufficient seed for next season's operations would be obtained. Only the light soils yielded any return. Teff grass proved its ability to survive under conditions fatal to most crops in the early stages of growth. The grape crop was fairly promising, but citrus trees suffered much from the drought. Cattle and horses were in fairly good condition, but the old mares were not likely to survive unless rain were to fall early in November.

## THE LARGEST CHEESE EVER MADE.

Some very large cheeses have been occasionally made in Australia; but our cheesemakers have never produced one which came within tons of one made in Lawrence County, New York, which was sent to the Panama Exposition at San Francisco, the weight of which was given at 6 tons. A cheese was made in September, 1892, at Perth, Ontario, Canada, which weighed 22,000 lb. net, or, in other words, 11 tons. This cheese was exhibited at the Chicago Fair in 1893. It required the milk from twelve factories for more than two days to make the Canadian cheese. The total quantity of milk used was 207,200 lb. Thus the Canadian Jumbo holds the record.

# The Orchard.

## FROST PREVENTION.

We have, for several years, pointed out to orchardists and others that the damage done by early and late frosts to blossoming fruit trees, vines, sugar-cane, &c., can be mitigated or even entirely prevented by very simple means. Owing to the comparatively inexpensive character of the material used in damp, smudge fires, these seem the best adapted for common use in orchards, vineyards, and gardens. Low-growing plants, such as pineapples, can be protected with but little expense by coverings of straw and other light materials. It seems that there is an idea that in October all danger from frost is over, but those who remember the 2nd, 3rd, and 4th days of October, 1899, know that such is not the case. In that year sharp frosts swooped over a large portion of the State. Never, in the history of wheat-growing in Queensland, has such a calamity occurred in October as the destructive frost of 1899. Far and wide on the Darling Downs, vast stretches of country were waving with billowy crops of wheat and barley just burst into ear. Suddenly, when all were rejoicing in the splendid harvest prospects, the calamitous frosts occurred, and it was found that nearly the whole of the crops on the lowlands were hopelessly ruined, and the disaster was further intensified in some districts by a hailstorm which destroyed what the frosts had spared. We believe that the frosts extended to the Central districts, and did much damage to the canefields.

Meteorological science is to-day so far advanced as to enable scientists to foretell a frost from twenty-four to to forty-eight hours in advance. This is an important point gained, and a warning of such a length enables one to make some preparations for saving at least a portion of a crop.

The fruitgrowers of Stanthorpe might, had a warning been received last October, have been saved much of the loss occasioned by the frost.

The most effective preventive is thick smoke, and this can be produced in several ways. One is by making heaps of wood, weeds, old cornstalks, or rotten straw. These should be lighted in the early morning, say, about 4 a.m.; and very shortly the fields will be covered by an artificial cloud, hanging like a curtain a little height above the soil. It should be borne in mind that if, in the winter, one thermometer is placed close to the ground, and another at a height, say, of 4 or 5 ft. above it, the temperature during a clear frosty night is from 10 to 12 degrees lower close to the ground. The smoke will be perfectly sufficient to prevent any damage by frost, provided the temperature on the ground does not fall lower than 6 degrees of frost—that is, to 26 degrees Fahr.

This protection is largely employed in America, France, New Zealand, and other countries. On this subject, a contemporary writes:—"With large supplies of crude oil available, Americans burn same in smudge pots on nights when the temperature falls to about 35 degrees,

and if the temperature falls lower more fires are lit, and consequently the temperature is raised considerably above the danger point. In New Zealand districts liable to frosts, the growers cut benzine tins in half and use them as receptacles for burning coal. Already these methods have saved thousands of pounds to growers, as the temperature can be actually raised fully 10 degrees to 12 degrees on frosty nights. One disastrous frost can wipe out the fruitgrower's expected harvest and nullify the laborious work of a year. The cost of installing these preventive measures is very slight, but it is an insurance against total or partial loss. It must be distinctly understood that it is necessary to make more than a big smoke on nights when the frost is serious. The temperature must be actually raised above freezing point (32 degrees Fahr.); in fact, it is an advantage to raise the temperature to above 35 degrees."

We shall revert to this important matter of frost prevention at a future date, when fruitgrowers at Stanthorpe, and in other districts liable to frost, may think it worth while to take a little trouble to save their crops.

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## THE COLD-WATER CURE FOR WOOLLY APHIS.

That hosing with plain cold water will keep woolly aphis in check, if done frequently and forcibly enough, is contended by a writer (Coleman Phillips) in the "Canterbury Times." It is a practicable idea for the owners of suburban gardens, although it may not commend itself to commercial orchardists; and it at least has the merit of being absolutely harmless to the trees. The writer also has a good deal to say about the injurious effects of poisonous sprays, and the desirability of encouraging the natural enemies of the different insect pests, some of which is debatable matter. But in regard to the cold-water cure he says:—

"My orchard of about 1,000 trees surrounds the house, and I found lately that two lengths of garden hose (50 ft. each) from the high-pressure water taps would command most of the trees. I had tried everything against the woolly aphis (kerosene and red oil emulsions, hand painting, &c.—all the oil remedies, in fact), and failed. I have not been successful with kerosene emulsion making; sometimes it goes well, sometimes badly, and I think this is the general experience; but it is a very useful remedy to have ready at hand.

"In spite of all I did the trees were becoming worse, so I resolved upon hosing the apples with plain cold water. The effect was simply marvellous. The trees remained clean for three weeks to a month, when I gave them another hosing. I hose four times in summer (in December, January, February, and March), as it is in these months the aphides increase. But the plan is to hose whenever the pest shows itself at all badly, even once a week. Two boys get over the orchard in a couple of days, one hosing, the other searching out ahead, and also going over the trees that have been hosed to discover missed spots.

"I try to hose just before the arsenate spray for Codlin moth; not that I believe in the arsenate at all, as I will show directly, but I am compelled by law to do it. After hosing a tree, churn up the soil beneath it with water for a little while to bury any of the aphides that are washed off. The hosing gives the trees a drink when they badly want one; it does not kill any natural enemy, which, unfortunately for us, all are conspicuous now by their absence, and it washes off a lot of other germs hostile to the health of the tree. The strong jst of water cleans out spiders, earwigs, aphides, &c., which congregate near the fruit buds, and the whole tree looks as clean as a new pin. These harmful aphides give in to nothing but force. And most of our spraying pumps are of little use. An oil-engine force or motor pump, costing anything over £100, is too expensive for small orchardists, but these pumps would give an orchard a wash down once a fortnight quite well and easily. It is this plain washdown I recommend, no matter how it is done, as the rain has not force enough to dislodge the woolly aphis.

"I do not say that the hosing washes all the aphides out of the crevices, because no force will do that. Only the searching little feelers and mouths of the natural enemy will get into these crevices, wherein lies their enormous use in upholding nature's balance. What I do affirm is that the hosing so keeps down the woolly aphis (and also washes off other harmful pests) that the evil is under control, and the next season's fruit buds are not injured. I do not say that we can entirely do without arsenate, Bordeaux, and red oils just yet; but I suggest that we should turn our attention to gradually dispensing with these poisons by breeding and turning out the natural enemy all over the Dominion, and then hosing our trees with plain cold water."

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## CONTROLLING THE WOOLLY APHIS.

Under the supervision of a special commission, M. Celestin Duval carried out on 19th August, 1913, at Boulonge-sur-Seine, experiments in controlling Woolly Aphis (*Shizoneura lanigera*). He used for the purpose a liquid insecticide prepared by himself, the composition of which he kept secret. An apple-tree covered with colonies of this aphis was sprayed with the insecticide; after about an hour all the insects reached by the liquid were dead, while no signs of scorching were observable on the leaves. On other trees treated in the same way, eight or ten days previously, there were no living aphids to be seen, nothing remaining but traces of the insects reduced to ashes. It thus seemed, in the opinion of the commission, that the method was efficacious and practicable. Being free from all necessity for reserve, M. Duval made known in 1914 the composition of his insecticide. According to the prescription of the inventor, the following solution must be used in case of leaves, young shoots, or wood of several seasons, during the growing seasons—Formula I.: Rain water, 10 gallons; carbonate of potash, 6½ oz.; sulphoricinate of soda, 4 lb.; methylated spirit, 2 lb.; strong extract of tobacco (10 per cent.), 1 lb. The spray gradually dissolves the waxy

coating of the aphids, so that finally all of them (females and young) are turned into a sort of dense paste, which soon dries up and becomes of a greyish colour. During the last two or three weeks of the vegetative period, when the leaves are about to fall naturally, and there is no fear of harming them, the following

STRONG SOLUTION

is used if there are still any aphids:—Formula II.: Rain water, 10 gallons; potash from ashes, 1 lb. or 19 oz.; sulphoricinate of soda, 4 lb.; strong tobacco extract, 2 lb.; methylated spirit, 2 lb. Although the insects are at this time encased in a thicker and less permeable wax envelope, they cannot resist the action of this mixture. The time comes when the sexual and fertilised females lay their winter eggs. In order to destroy the latter, all the holes, crevices, and cavaties of the cortex are painted over with the following composition:—Formula III.: Rain water, 10 gallons; soft soap, 35 lb.; sulphoricinate of soda, 5 lb. Finally, to destroy the aphids in their last refuge, which is the roots on which the sexual females assemble after having laid their eggs, a kind of basin is excavated round the foot of the tree so as to expose the roots on which the insects have gathered; then they are

WELL WATERED

with the solution of Formula I., or, if necessary, Formula II. As soon as they are seen to be dead the basin is filled in. M. Duval believes that if these different prescriptions are followed woolly aphis will disappear from the trees of a plantation.—"Monthly Bulletin of the International Institute of Agricultural Intelligence."

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## GRAFTING: REMOVAL OF BINDING.

A number of trees of various kinds have been grafted by officials of the Department in different villages. It is obviously impossible for them to return again to each village merely in order to remove the binding, and this must be left to the tree-owners themselves. The latter are invariably instructed on this point; but yet again and again the matter is neglected, and one frequently sees trees which have been sadly disfigured in consequence of the bandage having been left on too long. The bandage should be removed not later than 15 or, at most, 20 days after grafting. If left on beyond that time, the circulation of sap is interfered with, and whereas the new graft will develop and swell out above the head of the stock, that portion of it which remains under the binding will be undeveloped, and at the grafting point the graft will become so weak that it will be liable to be broken by any light wind.

The success of the binding operation is shown by the bud swelling, and then the head of the stock must be cut off to about 4—6 in. above

the union, so as to enable us to fasten to it the first season's growth and prevent it from being blown off. The remaining 4—6 in. of the stock's head should be furnished with leaves. Should there be no leaves, the stock should be cut off at a higher point, as the leaves are indispensable for the circulation of sap and for the success of the grafts. The remaining head of the stock must be cut just above the graft the following season.—"Cyprus Journal."

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## FRUIT TREE AND GRAPE VINE PRUNING.

We have received from the author, Mr. George Quinn, Horticultural Instructor to the Department of Agriculture, South Australia, a copy of his "Handbook for Fruit and Vine Growers," just published. In arranging the order of the subject matter, Mr. Quinn says that the sequence given is "that which a good many years of close and varied observation have led me to believe to be that which will be found the most conducive to obtaining a good grounding in the essentials of this fascinating subject." From beginning to end—from the basic principles of pruning to the framing of the tree, and to the renovation of old trees, to summer and winter pruning—the entire book places clearly before the fruit-tree grower and the vigneron the successive operations to be carried out for the formation of a successful orchard or vineyard. The instructions for the work and the reasons for it are given so clearly and in such simple language devoid of all unnecessary scientific verbiage, which in some treatises on orchard work serve only to confuse the non-scientific orchardist, that any reasonably intelligent man can follow and act upon them with little difficulty. The book, which covers 277 pages, and is most profusely illustrated with exceptionally good photographs, should prove of the greatest value to all engaged in fruit-growing, whether professionally or as amateurs. Mr. Quinn has by his work done a great service to them all.

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## BANANA CULTURE.

The Director of Fruit Culture (Mr. A. H. Benson) does not recommend the planting of maize between the rows of bananas. The only crops which should be so planted are crops for green manuring, which will tend to increase the organic matter in the soil as well as supply nitrogen for the use of the banana plants. Bananas are gross feeders, and the growing of any crop such as corn between the rows would be apt to deplete the soil of the plant foods which are required for the production of first-class bunches of bananas.

PLATE 23.—BOWEN: PORTION OF A CITRUS PLANTATION, SHOWING EMPEROR MANDARINS PLANTED 2½ YEARS AGO. DWELLING-HOUSE AND PACKING-SHED IN THE BACKGROUND.

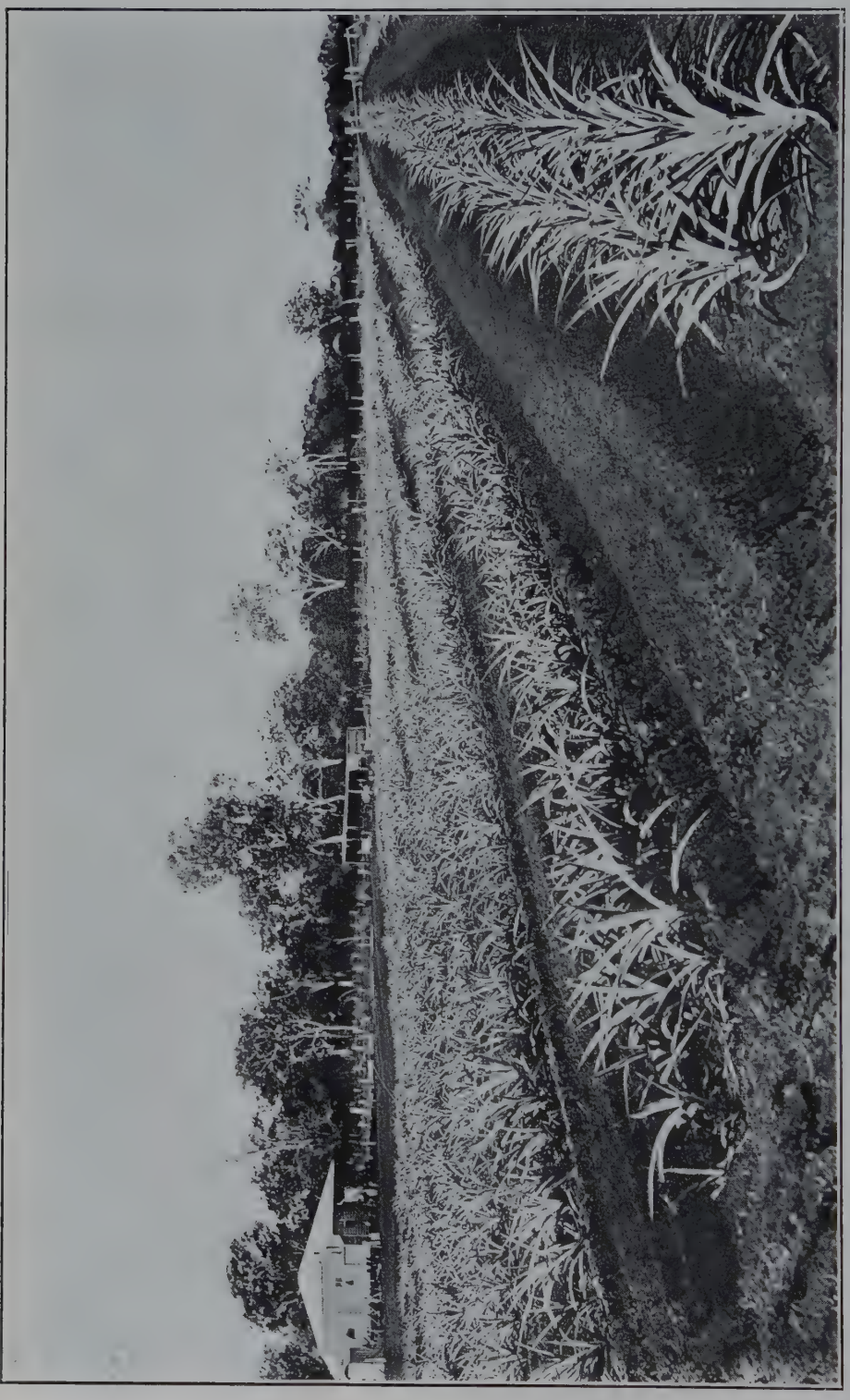

PLATE 24.—YOUNG PINE SUCKERS (SMOOTH LEAF) ON A BOWEN PLANTATION.

# Horticulture.

## THE PIGEON PEA.

Mr. W. McLean, of Spring Vale Experimental Farm, Boggabri, New South Wales, sends us the following notes of the *Cajanus Indicus*, or Indian Pigeon Pea:—

The seed should be planted in early spring, about 2 in. deep, and be well watered, when a light crop of peas may be obtained at the end of the summer. If frosts are severe, cover the plants lightly during the first winter. The tree will bear flowers throughout the winter, and towards the end will be one mass of flowers and pods. My trees are now so covered with flowers and pods that I have to prop the limbs up to keep them from breaking off. I may mention that the seeds are easily germinated. The tree is a quick grower, and very ornamental, and, once well established, is fairly hardy and mostly always in flower. The peas can be used dry or green.

Mr. McLean also contributes the three following items of interest to fruitgrowers and others:—

### GRAPE TOMATO.

This tomato is little known in these States. It makes an attractive arbour vine, with a profusion of delicious fruit for preserving, and it is very easily grown. Seeds require to be planted early in spring, so as to give the vine a long summer.

### RADISH (THE CHINA ROSE).

This is a radish that is little known. It is a delicious radish, with a beautiful colouring from light red, at the top, to almost pure white at the tip; very suitable for private gardens.

### FEIJOA SELLOWIANA, OR PINEAPPLE GUAVA.

This is a fruit suitable in many parts of Australia. A relative of the common guava, but very much superior to it. The fruits are considered delicious by many people, and a few of them will perfume a room with a pleasing fragrance. It is considered hardy, and will stand frost, down to 10 degrees above zero. It is considered very ornamental as a hedge shrub. It is very ornamental when in flower.

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## SOWING PEPPERINA SEEDS.

Mr. J. F. Bailey, Government Botanist, advises that the seed be sown about half an inch deep, in soil placed in a shallow box, at the bottom of which a layer of charcoal covered with dry grass should first be placed for drainage. When the seedlings are about 2 in. high, pot each off into a receptacle, such as a 1-lb. jam tin (assuming that a 4-in. flower pot is not available) filled with soil. Holes should be made in the bottom of the tin, and other drainage requirements provided, as above stated. When the plants are about 15 in. high, plant out (during showery weather, if possible) into the permanent situations. Keep the soil continually moist from the time of sowing the seed until the plants have become firmly established.

# Tropical Industries.

## COFFEE AND COFFEE RUST IN JAVA.

In Doctor Copeland's report on a visit to Java, published in the "Philippine Agriculturist and Forester" (April, 1915), he discusses the subject of disease, and, as he states in the following extract from his report, it would appear that a new species of pest of known parentage has appeared which has characters specifically different from those of the parent coffee rust in Ceylon. The extract referred to was republished in the "Agricultural News," Barbados, of 28th August, and reads as follows:—

"The coffee rust attacked Java several years before it reached the Philippines, and absolutely nothing but difference in the two Governments is responsible for the fact that Java has still an exceedingly important and profitable coffee industry, while that of the Philippines has been dead for the past twenty-five years. The Javanese Government met the coffee rust promptly with a fight by means of fungicides, by selection of the most resistant plants to be found locally, and by the importation of every other kind of coffee which could be found in the world. The result is that the various speciee of coffee which are now being experimented with at Los Banos, and in almost every other similar institution in the tropics, have all been brought to our attention by the Government of the Dutch Indies. The first of these to show great promise was Liberian coffee. This was widely heralded as a rust-resisting species, and was extensively planted in Java, and to a lesser extent in many other parts of the Old World tropics.

"It developed after a time that the quality of the marketed Liberian coffee was such that it could only be raised with a profit where labour is exceedingly cheap, and that even here it was at a serious economic disadvantage. The Dutch Government met this difficulty by a careful study of methods of preparation, with the ultimate result rather recently obtained—and for which, although I have myself made a considerable study of the subject, I was absolutely unprepared—that the Liberian coffee produced in Java is now being marketed at a price above that of the Arabian coffee for which Java itself is so famous.

"A wholly new and unexpected difficulty then presented itself. The Liberian coffee began to be attacked by rust, and these attacks increased in virulence year by year, until the coffee rust of Java now attacks Liberian coffee with approximately the same violence as Arabian. This is at the same time a matter of prodigious practical importance, and a fact of the utmost scientific interest. Neither the coffee nor the coffee rust is native in Java. It is practically impossible that the rust which now attacks the Liberian coffee should be anything else than a descendant of the rust which was formerly able to attack Arabian coffee but not Liberian. In other words, the pest has in the course of a number of years developed wholly new properties. Uninfected Liberian coffee has been exported from Java and raised elsewhere, and found immune to the

rust of the other regions. At the same time, new importations of Liberian coffee, immune to rust in the places of origin, have been brought into Java and promptly attacked. Now, the ability to live on a particular host is in very many cases regarded as a good specific character of a fungus. It can accordingly be regarded as definitely established that there has been developed in Java during the last twenty-five years a fungus of known parentage, but which now has characters specifically different from those of the parent coffee rust of Ceylon. This is the most satisfactory case known to me in the whole realm of science, of the evolution of a new species from a known parent within a definitely known length of time, and under conditions which are a matter of satisfactory record."

# Statistics.

## RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF OCTOBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING OCTOBER, 1915 AND 1914, FOR COMPARISON.

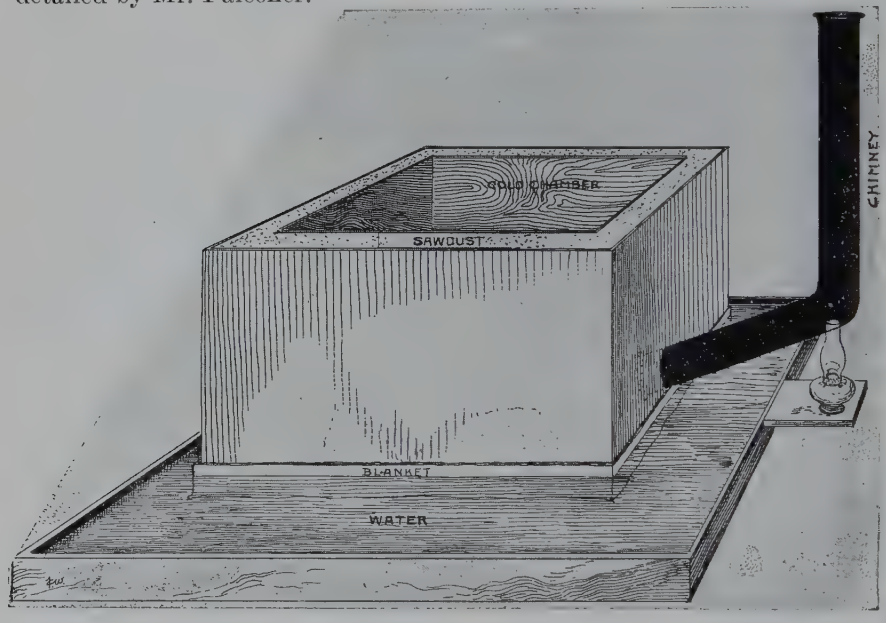
| Divisions and Stations. | Average Rainfall. | | Total Rainfall. | | Divisions and Stations. | Average Rainfall. | | Total Rainfall. | |
|---|---|---|---|---|---|---|---|---|---|
| | Oct. | No. of Years' Records. | Oct., 1915. | Oct., 1914. | | Oct. | No. of Years' Records. | Oct., 1915. | Oct., 1914. |
| *North Coast.* | In. | | In. | In. | *South Coast*—continued: | In. | | In. | In. |
| Atherton ... ... | 0·74 | 13 | 0·25 | 1·50 | | | | | |
| Cairns ... ... | 1·60 | 27 | 0·17 | 2·32 | Nanango ... ... | 2·28 | 27 | 0·83 | 3·12 |
| Cardwell ... ... | 1·74 | 27 | 0·78 | 3·14 | Rockhampton ... | 1·65 | 27 | 1·72 | 5·69 |
| Cooktown ... ... | 0·94 | 27 | 1·35 | 0·86 | Woodford ... ... | 2·74 | 27 | 0·21 | 3·92 |
| Herberton ... ... | 0·96 | 27 | 0·19 | 0·95 | Yandina ... ... | 3·28 | 21 | 0.83 | 6·25 |
| Ingham ... ... | 1·39 | 22 | 3·35 | 3·39 | | | | | |
| Innisfail ... ... | 2·45 | 27 | 2·01 | 7·33 | *Darling Downs.* | | | | |
| Mossman ... ... | 3·31 | 5 | 1·51 | 4·22 | | | | | |
| Townsville ... ... | 1·18 | 30 | 0·15 | 0·38 | Dalby ... ... | 2·27 | 27 | 0·38 | 1·45 |
| | | | | | Emu Vale ... ... | 2·60 | 17 | 0·31 | 2·16 |
| *Central Coast.* | | | | | Jimbour ... ... | 2·01 | 24 | 0·16 | 0·99 |
| | | | | | Miles ... ... | 2·09 | 27 | 0·42 | 2·73 |
| Ayr ... ... ... | 0·88 | 27 | 3·44 | 0·08 | Stanthorpe ... | 2·48 | 27 | 0·33 | 2·46 |
| Bowen ... ... | 0·88 | 27 | 2·02 | 0·54 | Toowoomba ... | 2·56 | 27 | 0·26 | 3·96 |
| Charters Towers ... | 0·75 | 27 | 0·03 | 0·01 | Warwick ... ... | 2·42 | 27 | 0·02 | 2·70 |
| Mackay ... ... | 1·69 | 27 | 0·99 | 3·86 | | | | | |
| Proserpine ... ... | 1·48 | 11 | 1·95 | 3·18 | | | | | |
| St. Lawrence ... | 1·69 | 27 | 2·08 | 5·77 | *Maranoa.* | | | | |
| | | | | | Roma ... ... | 1·84 | 25 | 0·16 | 0·82 |
| *South Coast.* | | | | | | | | | |
| | | | | | *State Farms, &c.* | | | | |
| Biggenden ... ... | 2·23 | 14 | 1·01 | 4·05 | | | | | |
| Bundaberg ... ... | 1·97 | 27 | 0·80 | 6·36 | Gatton College ... | 2·56 | 14 | 0·05 | 3·96 |
| Brisbane ... ... | 2·71 | 64 | 0·25 | 2·47 | Gindie ... ... | 1·17 | 13 | 0·83 | 4·43 |
| Childers ... ... | 2·02 | 19 | 0·27 | 4·95 | Kamerunga Nurs'y | 1·53 | 23 | 0·25 | 3·71 |
| Crohamhurst ... | 3·74 | 22 | 0·21 | 6·42 | Kairi ... ... | ... | ... | Nil | 0·84 |
| Esk ... ... ... | 2·45 | 27 | 0·50 | 3·66 | Sugar Experiment | | | | |
| Gayndah ... ... | 2·24 | 27 | 0·11 | 2·94 | Station, Mackay | 1·60 | 16 | 1·61 | 4·75 |
| Gympie ... ... | 2·42 | 27 | 0·16 | 4·94 | Bungeworgorai ... | ... | ... | 0·16 | 1·36 |
| Glasshouse M'tains | 3·40 | 6 | 0·20 | 3·45 | Warren ... ... | ... | ... | 3·09 | 2·85 |
| Kilkivan ... ... | 2·59 | 27 | 0·45 | 1·19 | Hermitage ... | 2·15 | 7 | 0·20 | 1·90 |
| Maryborough ... | 2·11 | 27 | 0·11 | 5·00 | | | | | |

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for October this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

# Science.

## ARTIFICIAL COLD.

At the request of a correspondent, we reprint an article on the above subject which we received in 1902 from Mr. G. Monks, One-mile, Gympie, a very instructive and interesting paper read by Mr. John Falconer, C.E., at an agricultural conference held in Bundaberg in June, 1893. As we are now approaching the hottest summer months, perhaps some of our readers might like to make a trial of the process as detailed by Mr. Falconer.




The general idea is thus stated:—When by any process, a change is produced in the form of matter, it undergoes certain developments; thus, when gas under pressure becomes liquefied, it gives off a great amount of heat, and when it again is allowed to expand it takes up heat from its nearest surroundings. That is the principle in all plans or systems whereby artificial cold is produced. If, when air is compressed in a cylinder, it is surrounded by water, the temperature of the cylinder will be reduced; but when the air is released again, if it be conducted through a pipe surrounded by water, the latter will be frozen, as the air in expansion takes up as much heat as it had before it was cooled after being reduced, and it takes up heat from whatever it comes in contact with. Mr. Falconer exhibited a cylinder into which gas had been pumped with great force, until there was a pressure inside it of nearly 300 lb. per square inch. Now, if a small pipe were attached to this cylinder, and the pipe were conducted through a bucket of water, the expanding

liquid gas would recover from the water all the heat it had before it was condensed and liquefied in the cylinder, and the expanding of the gas would cause the absorption of the heat surrounding the pipe and reduce the temperature of the water until it becomes frozen.

A model of a safe was then shown. Of this safe the author said—

"Twenty years ago I designed and had constructed for a friend near Brisbane a dairy on the principle here shown, and on the hottest day in summer you could always be sure that the dairy was a cool place; it was constructed on the side of a hill, and is in use to the present day (1893). The model was thus described:—A box having the appearance of an ordinary safe. It is double, and between the inner and the outer boards there is a packing of sawdust, which is a non-conductor of heat. It is airtight, except at the bottom. It stands in an open trough in which there is water, and around the bottom there is a casing of four plies of blanketing. At the side there is an air chimney, and under the elbow of the pipe is an ordinary kerosene lamp, the chimney of which enters the funnel through a small tube. The combustion of the air in the lamp creates an expansion of the air in the funnel; if the lamp is turned up high, a roaring is heard in the funnel, caused by the rush of expanding air through it, for the heated air passing up the funnel causes a partial vacuum in the box, expanding the air in it, and causing a draught. The outer air having no inlet, except through the wet blanket, becomes rarified in its passage through the chamber, and the desired effect—*i.e.*, cold storage—is produced, for the expanding air must get heat, and it gets it from whatever it comes in contact with; in other words, the heat is drawn from whatever is in the chamber to supply the requirement of a natural law. If a larger lamp is used, the expansion becomes greater, and whatever is in the chamber will be frozen.

The dairy constructed by Mr. Falconer was built on this principle, with a brick chimney. Butter was kept in it for months in sound condition, and the interior was so cold that no one would care to remain in it for half-an-hour.

We have, unfortunately, not got the model of Mr. Falconer's safe, but Mr. Monks has suggested the accompanying construction.

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## BANANA ASH.

A sample of banana ash was recently forwarded to Mr. J. C. Brünnich, Agricultural Chemist, for an estimate of its potash contents. This sample has been analysed with the following result:—

"The sample of crude banana ash submitted, contained in percentage:—

| | |
|---|---|
| Potash | 16·6 |
| Lime | 5·0 |
| Phosphoric acid | 1·4 |
| Insoluble, chiefly carbon | 34·7 |

This ash would be worth, at the present time, about £8 per ton. The yield is very small (about 1 per cent.), which agrees with our previous analyses; and the commercial utilisation of the banana stalks for production of potash manure is out of question. At the same time, it shows the importance of allowing the stalks to rot in the fields to return their mineral constituents to the soil."

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## LIME REQUIREMENTS OF QUEENSLAND SOILS.

BY J. C. BRÜNNICH AND E. H. GURNEY.

The application of lime to our agricultural lands has been advocated for years in this Journal and by the officers of the Department, and recent investigations appear to indicate that the need for liming is even greater than anticipated.

Every farmer is familiar with the term **sour** or **acid soil,** but may not be aware of the far-reaching effect which the reaction of the soil has on the production of crops. A soil may have an **acid, neutral,** or **alkaline reaction;** and its fertility may largely depend on this condition.

Although most of our fertile agricultural soils have a slight acid reaction, it may be safely asserted that the great majority of crops would do better if lime could be added in sufficient quantities to reduce this acidity and make the reaction as near as possible neutral. A few crops are the exception, and, for instance, potatoes do better and are freer from disease when grown on slightly acid soil.

A **high acidity** in a soil affects the plants adversely by a direct action on the root system, and by an indirect action on the micro-organisms in the soil. A **high alkalinity** again is not an advantage, and if such alkalinity is due to soda carbonate, the soil may be quite sterile.

The acidity of a soil is easily tested, by bringing the moist soil into contact with blue litmus paper, which according to the degree of acidity will become more or less reddened; when done with care, a fair idea with regard to the amount of lime required for such soil may be obtained.

The actual amount of lime present in a soil, whether found by extracting with hydrochloric acid or dilute citric acid, is not a sufficient guide to tell the farmer what amount of lime should be added to bring the soil to neutrality; and from the table published at the end of this paper it can be easily seen that some soils, containing a fair or even high amount of lime, are still in need of a heavy dressing with lime.

F. T. Veitch elaborated an accurate estimation of soil acidity with the aid of lime water ("Journal American Chemical Society," 1902, Vol. XXIV., p. 1120); and the results obtained by his method of the lime requirement of a soil show a fair agreement with the crop results on the addition of lime.

Quite recently H. B. Hutchinson and K. McLennan published a simple and rapid method for the determination of **lime required for soil neutralisation** ("Journal of Agricultural Science," 1915, Vol. VII., Part 1); and this method was used for the testing of some of our typical Queensland soils. The results of these tests are appended in tabulated form. In the table the amounts of lime (expressed as CaO) found by analysis are given in percentage, and the amount of lime necessary for neutralisation of the soil to a depth of 12 in. are given in cwt. of lime carbonate per acre. [A percentage of ·056 of lime oxide (CaO) or ·1 of lime carbonate ($CaCo_3$) is equal to about $17\frac{1}{2}$ cwt. of lime oxide or 31·2 cwt. of lime carbonate per acre-foot.]

**Air-slaked stone** or **quicklime,** when applied to a soil, will have the most powerful and quickest action; it not only neutralises any acidity, but has a very strong action on the organic matter present in the soil, and also on the micro-organisms in the soil, with a partially sterilisation effect.

As a rule, we recommend to our farmers the use of **lime carbonate,** in form of finely ground **limestone** or **marble,** or **coral and shell sand;** but, in order to be effective, the limestone must be ground as fine as possible.

Hitherto it was considered necessary to apply the lime as a top dressing, as the leaching effect of rain water will tend to wash the lime into the soil; but recent experiences have shown that this action is extremely slow, and for this reason it is better to thoroughly mix the lime with the soil after application by ploughing or scarifying.

Unfortunately, at the present time, some prohibitive prices have been charged for agricultural lime in some instances, and, although limestone screenings are obtainable at the quarry for 5s. to 7s. 6d. per ton, as much as £2 10s. per ton has been charged for shell sand of inferior quality. Any finely-ground limestone should not cost more than about 10s. per ton, so that in most localities the cost of lime to the farmer, after paying all charges for freight, &c., should not be more than £1 to £1 10s. per ton; and at such a price the farmer could profitably apply the necessary heavy dressings.

It would be very interesting and of great value if on some farms experiments were made applying the amounts of lime recommended for neutralisation, and to compare the crops obtained from limed and unlimed portions for a few seasons.

| Locality. | Soil. | Per Centage Lime (CaO), Soluble in— | | Reaction. | Lime Required. Lime Carbonate ($CaCO_3$). Cwt. per Acre. |
|---|---|---|---|---|---|
| | | Hydrochloric Acid. | Citric Acid. | | |
| Yandina | Black loam (swampy) | 0·27 | ·0274 | Strongly acid | 150 |
| Buderim Mountain | Chocolate sandy clay | 0·27 | ·0980 | Acid | 100 |
| Cooroy | Brownish fine sandy loam | 0·11 | ·0764 | Very acid | 94 |
| Proserpine | Brown clay | 0·47 | ·0824 | Acid | 94 |
| Mackay | Chocolate fine sandy loam | 0·95 | .. | Acid | 87 |
| Buderim Mountain | Sandy clay | 0·37 | ·1195 | Acid | 78 |
| Proserpine | Brown sandy clay | 0·43 | ·1000 | Acid | 78 |
| Woodford | Brown sandy loam | 0·20 | ·0818 | Strongly acid | 78 |
| Bundaberg | Reddish-brown loam | 0·46 | ·0826 | Slightly acid | 70 |
| Rockhampton | Grey sandy clay | 0·43 | ·0936 | Strongly acid | 47 |
| Ayr | Yellowish-grey loam | 0·28 | ·1074 | Acid | 41 |
| Kingaroy | Chocolate fine sandy loam | 0·41 | ·2244 | Acid | 41 |
| Mulgrave | Brown sandy loam | 0·32 | ·0575 | Acid | 39 |
| Nambour | Brown medium sandy soil | 0·12 | ·0914 | Acid | 37 |
| Beenleigh | Brown fine sandy loam | 1·57 | .. | Acid | 31 |
| Bundaberg | Reddish fine sandy loam | 0·54 | ·1978 | Acid | 31 |
| Greenmount | Dark-brown loam | 1·36 | ·2454 | Acid | 28 |
| North Arm | Yellowish-grey sandy clay | 0·18 | ·1312 | Slightly acid | 27 |
| Westwood | Dark-grey sandy clay | 1·56 | ·2500 | Slightly acid | 27 |
| Ayr | Greyish-brown loam | 1·04 | ·1474 | Acid | 26 |
| Stanthorpe | Grey sandy clay | 0·18 | .. | Acid | 25 |
| Bundaberg | Red volcanic clay | 0·58 | ·1812 | Acid | 25 |
| Tarampa | Greyish sandy loam | 1·70 | ·2424 | Acid | 22 |
| Gatton | Black medium sandy soil | 1·07 | ·1975 | Slightly acid | 22 |
| Miles | Brown medium sandy soil | 0·31 | ·0736 | Acid | 16 |
| Murgon | Dark-grey sandy loam | 0·86 | ·2660 | Neutral | 12 |
| Mackay | Brown loam | 0·92 | ·2064 | Acid | 12 |
| Bowen | Brown sandy clay | 1·48 | .. | Neutral | 6 |
| Goombungee | Dark alluvial sandy loam | 0·73 | ·1364 | Acid | 5 |
| Bungeworgorai | Dark-buff sandy clay | 0·21 | ·0620 | Neutral | 0 |
| Nobby | Black sandy loam | 2·19 | ·2922 | Slightly alkaline | 0 |
| | | | | | *Lime ($CaCO_3$) in excess of neutrality; Cwt. per Acre.* |
| Fassifern | Light-brown clay | 1·26 | ·4000 | Neutral | *1* |
| Westbrook | Black sandy loam | 1·60 | ·3216 | Neutral | *1* |
| Bowen | Dark-brown sandy loam | 1·47 | .. | Neutral | *8* |
| Rosewood | Grey sandy clay | 0·98 | ·3392 | Strongly alkaline | *11* |
| Kynuna | Brown fine sandy loam | 1·77 | ·5606 | Alkaline | *17* |
| Greenmount | Black loam | 2·86 | ·4782 | Alkaline | *25* |

# Botany.

## NOTES BY THE GOVERNMENT BOTANIST.—No. 1.

### PLANTS POISONOUS TO STOCK.

Owing to scarcity of feed during the past season several plants, at other times almost untouched, have caused considerable injury to stock. Among these, *Hoya australis* and *Gastrolobium grandiflorum* have been particularly severe; and the following interesting accounts regarding their effects on stock have been received:—

### WAX-FLOWER (*HOYA AUSTRALIS*).

This succulent twiner has for many years been looked upon with disfavour by stockowners, and was referred to by Bailey and Gordon in "Plants Reputed Poisonous to Stock" (1887) as the cause of the deaths of a number of sheep while being driven through a scrub in which a quantity of it was growing.

During the past few months quite a number of letters have been received from stockowners from different parts of the State forwarding this plant for identification, with the remark that they suspected it of causing losses amongst stock. As, judging from the numerous specimens received for name and information, the plant does not seem very well known, it has been deemed advisable to publish the following description and notes, together with a figure which should aid in its identification.

In December, 1914, specimens were forwarded from J. J. O'Dempsey, Freestone Creek, as causing the death of several cattle; these specimens were submitted to the Agricultural Chemist (J. C. Brünnich), who reported that they did not respond to the specific tests for the more commonly recurring organic poisons (prussic acid, saponin, and alkaloids).

In August last, a quantity of the plant was forwarded to the Editor of the "Queensland Grazier" by A. J. McCanny, Nanango, with the following remarks:—"Last week two fat bullocks died in one of my paddocks; in fact, one bullock was not quite dead when I found him. He had been down some hours and could not get up, and the whole time I was with him he was in a fit of convulsions. I afterwards skinned him and opened him up; he was a perfectly sound bullock, with one exception, and that was in the part called the 'Bible.' I felt this, and it was as hard as a rock; and when I opened it, the contents, instead of being soft, were hard and dry and very light. Some of the leaves of the plant now sent were found in the stomach."

These specimens were handed over to the Director, Stock Experiment Station, Yeerongpilly, who reported as follows:—"Four guinea pigs were placed in a cage on the 7th instant (August), and fed with *Hoya* vine. Two of the youngest ones developed symptoms of paralysis on the

PLATE 25.—WAX-FLOWER (*Hoya australis*).

second day; one died on the third day, and one on the fourth day; the remaining two guinea pigs, which were older, developed only slight symptoms of paralysis, but eventually recovered."

About the same time, the Department received a letter from H. H. C. West, Jandowae, who reported the loss of 15 head of cattle through eating this plant. All seemed to be affected in the kidneys and hind quarters, but that other cattle had recovered, especially those drenched with Epsom salts.

A. McGown, M.R.C.V.S., recommends the following remedy:—"1 lb. Epsom salts and 1 lb. treacle should be given as soon as the animal is noticed to be sick, which should be followed daily with 2 dr. potassium iodide dissolved in half a pint of water."

The following is a brief description of the plant:—

"A succulent twiner, glabrous or the leaves sometimes with a few scattered hairs. Leaves thick, fleshy, on short stalks, ovate, obovate or nearly orbicular, obtuse or shortly pointed, rounded or almost cordate at the base, 2-4 in. long. Flowers white, in simple umbels borne on short stalks. Fruit (follicles) several inches long, slender; seeds numerous, with tufts of silky hairs attached."

## WALL-FLOWER OR HEART-LEAVED POISON BUSH.

### (*GASTROLOBIUM GRANDIFLORUM.*)

With regard to this well-known plant of the north-western parts of the State, the following information received from H. A. Crawford, Maryvale Springs, Yalleroi, are of such interest that they are here given to supplement the former articles in this Journal—namely, September, 1889, by F. M. Bailey; and August, 1908, by J. C. Brünnich. In a letter dated the 15th of September last Mr. Crawford writes:—"There are a great many conflicting opinions regarding it still being poisonous after it is cut, even among men who have had years of experience amongst it. I myself fed two sheep in a pen with some which had been cut for three months and five days, and both sheep appeared to eat an equal quantity of it. One died, and the other was hardly affected at all—just seemed a bit sick for a few days, but not enough to stop it from eating and drinking as usual." After reading the above-mentioned articles, Mr. Crawford, in a further letter, states:—"The poison in this plant cannot be of a volatile nature, as I have known the dry plants, which have been cut and lying out exposed to the weather, to kill both horses and sheep when it had been cut three months and five days. I opened a horse which had died from eating this dried poison, and the stomach appeared to have patches of a white hard substance like solidified froth adhering to it, and the tissues of the stomach appeared to be very tender. You could poke your finger through it anywhere. The first symptoms the horses showed were that they stood with their heads down close to the ground and their legs wide apart. You could ride up to them and crack a whip alongside of them, and they would not appear to know you were there. If hit with the whip, they would take a few steps forward and seem to have hard work to keep their balance and could

PLATE 26.—WALL-FLOWER OR HEART-LEAVED POISON BUSH (*Gastrolobium grandiflorum*).

only do so by walking with their legs wide apart. In almost every case, the lips swelled up considerably, and in some cases also the whole head, and they kept their mouths open slightly with the saliva dripping out as if their mouths had been burnt. The inside of the mouth also looked as if it had been scalded or burnt in patches. In the later stages they all appeared to get spasms and twitchings, and very often would spin round several times before they would fall down. They would get up again, and would stand with legs wide apart, with the ears and muscles all twitching and the flank muscles continually contracting as if with griping. They all appeared to go blind, and the eyes would not blink if a stick was waved close to the eye unless it happened to touch the eye-lashes. I tried to drench several with oil, but could not get any to swallow. Some that were put into a yard with water kept dipping their mouths into it and letting it run back into the trough. These afterwards recovered. Some of them passed what seemed to be the mucous lining of the stomach or bowels, and from then on began to eat a little. The sheep, which I fed in a pen, and which died, showed similar symptoms to the horses. Out of nine horses poisoned in one night three died and the rest recovered."

## BARB-WIRE INJURIES.

We are frequently asked what is the best way to deal with injuries sustained by stock—especially horses—by contact with barbed wire. Dr. A. S. Alexander, Department of Horse Breeding, Wisconsin advises:—

"After a barb-wire accident, do not apply axle grease or any rancid ointment to the wound. Wash the wound thoroughly with warm water. Then clip the hair as close as possible around it, and wash again to remove any hair or other foreign substance.

"When sand or hair has lodged in the depths of a deep cut, never use a wet sponge to clean it out. Use a piece of absorbent cotton or cotton batting. There will be much less risk of infection.

"It will be useless to put stitches in a wound that is very deep or ragged, or that is located in a place not in perfect rest when the animal is making natural movements.

"Dry dusting powder has a healing effect on barb-wire wounds and other large moist cuts and abrasions. Such a powder may be prepared cheaply by mixing together equal parts of slaked lime, sulphur, and charcoal.

"Prevent lock-jaw dangers in nail wounds of the hoof by opening them up freely, which provides drainage for serum and pus. Saturate with a solution of corrosive sublimate and water in the proportion of 1 to 500. Cover with dusting powder, absorbent cotton, and a bandage. This treatment should be repeated daily until the wound is healed."

[Mr. McGown, M.R.C.V.S., Veterinary Surgeon to the Queensland Department of Agriculture and Stock, is quite in accord with this treatment for barb-wire wounds.—Ed. " Q.A.J."]

# Entomology.

## REPORT OF THE ENTOMOLOGIST TO THE BUREAU OF SUGAR EXPERIMENT STATIONS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following monthly report from Mr. E. Jarvis, Entomologist to the Bureau:—

"At this time of the year, when neither grubs nor beetles are procurable for experimental purposes—the former having transformed into pupæ from which the latter have not yet emerged—opportunity is afforded for reviewing past work and preparing for future investigations. The present season is unusually interesting, owing to the continuance of dry weather and consequent establishment of abnoraml climatic conditions which are certain to exercise important influences on the economy of soil-frequenting larvæ.

"In a previous report, when alluding to what I have termed meteorological control, it was mentioned that during September and October, 1914, larvæ of our mealy-backed cockchafer had pupated unusually near the surface and large numbers had been ploughed up on volcanic soils. This exceptional circumstance was no doubt due to the abundant rainfall experienced at Gordonvale during August, 1914, thirteen days of which were wet, the registered amount having exceeded the average for that month by an additional 3·45 in. It has already been pointed out that excessive wet about that time of year tends to induce grubs to pupate near the surface, and, should hot weather set in shortly after pupation and continue for a month or so, great numbers of pupæ lying in light volcanic and sandy soils under seed cane would be likely to perish owing to the earth above them drying out before they were able to transform into beetles.

" Unfortunately, as foretold in a previous monthly report, further rains about the end of October, 1914, put an end to our hopes in this direction, by maintaining ideal soil conditions for the development of cane beetles. To the occurrence of this latter rain must, I think, be attributed in great measure the severity of the recent outbreak at Greenhills, where no less than 25 tons 11 cwt. of grubs were collected during March, April, and May, 1915, at a cost of £749 sterling.

"It appears more than likely that this serious monetary loss would have been very considerably reduced had the dry weather continued throughout October.

"No rain fell at Gordonvale last month, and as on outcome of prolonged drought grubs infesting light soils started to pupate about the middle of August, three weeks earlier than last year.

"Wishing to ascertain the position of existing pupæ, tests were applied on the 3rd October to a plot of affected volcanic land by digging a number of pits 5 ft. square by 2 ft. deep at varying distances apart.

" The first four holes contained collectively 23 pupæ, 4 larvæ, and 1 beetle of *Lepidiota albohirta,* besides 32 grubs of other species of Scarabacidæ (principally *L. frenchi*) in various stages of growth.

No pupæ were unearthed nearer than 1 ft. from the surface, and none deeper than about 15 in.

"The majority were lying in earth that was nearly dry.

"A month later further tests were made on the same piece of land, when it was found that the soil had become slightly drier and fully 20 per cent. of pupæ perished; while the remained had transformed into beetles which were resting in their pupal chambers awaiting the occurrence of rain sufficiently heavy to soften the ground and enable them to escape.

"Should the present weather conditions continue, it will be interesting to note the effect of drought on these adult insects imprisoned in the soil."

## MEASUREMENT OF CATTLE BY WEIGHT.

To arrive at a close estimate of the weight of cattle, mere guesswork is not reliable. There is, however, a rule by which the weight can be very accurately determined. There is one condition in connection with this method, which cannot easily be adapted to the guessing competition of the fat bullock, say, at the National Association's Exhibition at Bowen Park. That condition is that the competitor must be able to handle the beast, and this, of course, cannot be permitted, where the weight has to be arrived at by merely studying the build and condition of the animal.

THE RULE IS—

Multiply the square of the girth by 5 times the length. Divide the product by 21. This gives the net weight of the animal in imperial stones of 14 lb. Or, to obtain the weight in scores, divide by 30.

EXAMPLE.

An animal girths 7 ft., and is $5\frac{1}{2}$ ft. in length.

The square of the girth is $7 \times 7 = 49$; 5 times the length is $27\frac{1}{2}$. Then $49 \times 27\frac{1}{2} = 1{,}347\frac{1}{2}$.

Divide this by 21. Result: 64 stones 2 lb., or 898 lb. Or, dividing by 30. Result: 44 scores 18 lb., or 898 lb.

If the animal is very fat, $\frac{1}{15}$ should be added to the weight thus obtained; if not moderately fat, $\frac{1}{15}$ should be deducted.

# General Notes.

## A GOOD FLY GLUE.

1. Melt together 6 parts of colophony, 4 of rapeseed oil, and 3 of resin.

2. Eight parts of resin, 4 parts each of turpentine and rapeseed oil, and ½ part of honey.

3. Boil to a thick paste 1 lb. of resin and 3½ oz. each of molasses and linseed oil. Apply either of these mixtures to a thick stick, and plant it in a pot filled with sand.

## POLLINATING TOMATOES.

The Biologist of the New South Wales Department of Agriculture has tried a practice in vogue in the Channel Islands (Guernsey, Jersey, Alderney, and Sark), where large quantities of tomatoes are raised for the early London market. There the tomatoes are staked, and boys are frequently sent round daily to strike the stakes with a stick. The shaking thus received by the plant is said to promote pollination, and to result in a larger production of fruit. The Biologist mentioned tried the experiment with tomatoes grown under glass, and, whatever other causes may have operated, he obtained excellent results.

## FUMIGATION OF EGYPTIAN COTTON SEED.

The "Board of Trade Journal" publishes the following note in regard to Egyptian cotton seed:—

H.M. High Commissioner for Egypt reports to the Foreign Office that the Egyptian Ministry of Agriculture is anxious to call the attention of all purchasers of Egyptian cotton seed to the desirability of insisting on its fumigation at the port of shipment, with the object of destroying the pink boll worm which it may contain.

It is almost certain that this parasite first reached Egypt in bales of imperfectly ginned cotton from India, and it is very probable that it will be introduced into other countries where Egyptian cotton seed is sown, unless the seed is previously fumigated.

With a view to eradicating the pink boll worm in Egypt, measures are being taken to introduce a law requiring the fumigation of all cotton seed in Egypt.

It will be some time before these measures can be universally adopted owing to the absence of adequate machinery, but in the meantime the Ministry of Agriculture is ready to fumigate small amounts of seed, supplying a certificate of fumigation with the consignment.—"Agricultural News."

## MONEY IN WATTLE BARK.

In the Report of the Durban Chamber of Commerce for 1914 it is stated that the Natal wattle bark trade has suffered a check by reason of the war. The exports for the first seven months of 1914 amounted to 47,663 tons, as compared with 39,899 tons in the corresponding period of the previous year; but the total amount exported in 1914 was only 58,132 tons, valued at £286,399, as compared with 65,042 tons, valued at £309,268, in 1913. Had conditions been normal, it is stated, the exports for 1914 would have exceeded those of 1913.

The wattle-tree thrives so well in Queensland, that it appears surprising that a large business in the wattle-bark industry has not long since been built up. At one time small quantities of wattle bark were obtained, principally about Dalveen; but of late nothing has been heard of an industry which brings in from £286,000 to £309,000 per annum in South Africa.

## THE "AUSTRALIAN SUGAR JOURNAL."

Those who are interested in sugar-growing in Queensland will welcome the November issue of this Journal for many reasons, the main one being that, besides the usual interesting current topics on the Sugar Industry—as, for instance, on Sugar Conferences, Workers' Accommodation Bill, Experiment Work in other Lands, &c., it gives, in this issue, a *resumé* of the Auditor-General's Report on Central Sugar Mill Companies for 1914-15. The operations of these mills are not given much space in even the newspapers published in the Sugar Districts; but we have it here almost *in extenso*, so that growers and millowners can compare notes on their respective activities. The articles in "Sugar District Notes" are also most interesting and of very great value, not only to existent cane-growers, but to prospective investors. On the whole, the November issue of the "Sugar Journal" is, in our opinion, a most valuable record of the Sugar Industry in Queensland, and well worthy of careful study.

## PRICES FOR PIGS.

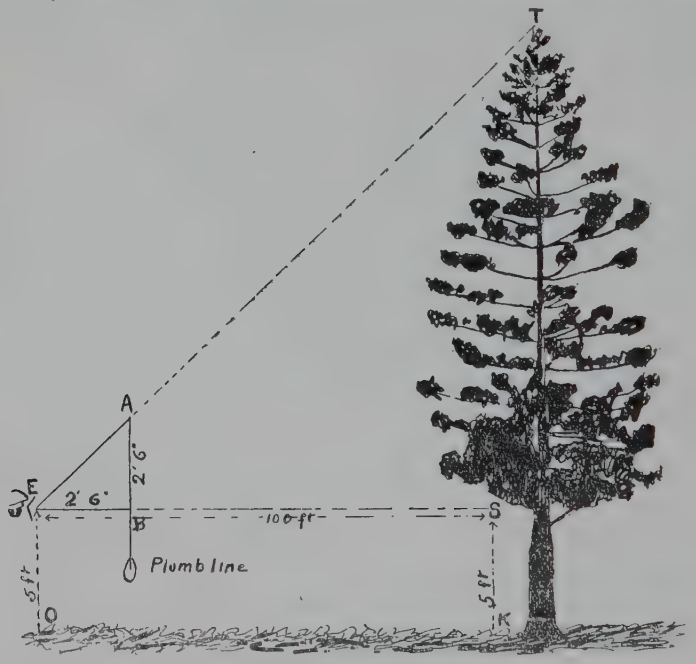
Referring to a note on high prices paid for pigs at Maryborough, which appeared in the October issue of this Journal, Mr. W. H. Davidson, Wilmount, Tambourine Mountain, writes:—"About the same date (7th September), 'back-fatters' at the Nerang pig sales sold for £9 5s., which is the highest price paid for a factory pig in this State, that I have heard of so far. Your correspondent at Tinana quotes the *maximum* price for a fat pig at Maryborough, but as the weight is not given, it leaves one in doubt, but I can quote, probably, the *minimum* for a fat pig sold at Maryborough about the year 1873, when my father sold a white pig weighing slightly over 500 lb. for £1 10s. I believe backfatters reached the vicinity of £20 this last winter in Melbourne." Mr. Davidson forwards two cuttings from the "Australasian" of August and September, 1915, in which the prices of prime backfatters ranged from £8 to £18.

## PRICE OF SILK COCOONS.

Latest advices from European sources give the price of Russian cocoons as from £1 8s. to £2 8s. per poud (36 lb.)—about 9¼d. to 1s. 4d. per lb.; 1,600 cocoons go to 1 lb., and 1 acre of land will produce 300 lb. of cocoons.

## MEASUREMENT OF STANDING TIMBER.

Mr. L. M. Daniel, Elsternwick, in forwarding the accompanying sketch to "The Leader," writes:—Selectors and others frequently want to find out the quantity of timber in a standing tree. The method described here will give the contents of timber in a tree approximately, and does not take into account accurately the whole of the limbs. Cut




a piece of pine or deal board into a triangle right-angled at (B). Let the observer place the long edge of board to his eye, and move backward or forward (on level ground) until the edge of board exactly coincides with top of tree, taking care that the plumb line is along edge AB, and hangs steady. Now measure from eye to butt of the tree (say, 100 ft.). This distance, plus the height of eye from the ground, is the height of the tree. (*See* example in illustration.) ES plus EO equals TK. ES equals 100 ft; SK or EO equals 5 ft; therefore height of tree is 105 ft. Cubic contents of tree approximately. To find the cubic contents of tree, multiply the square of half the diameter of tree by 3·14, and multiply this product by half the height of tree:—Diameter of tree is 4 ft.; square of ½ diameter equals 4 by 3·14 by 52·5 equals 659·4 cubic feet."

Another simple method of ascertaining the height of a tree can be used on a sunshiny day.

Cut a stick about 12 in. long. Place it upright in the ground. Note the height of the stick above the surface and measure the length of the shadow thrown by it. Then measure the shadow of the tree. Suppose this to be 20 ft., and the shadow of the stick to be 6 in. The question then is:—If a stick 12 in. high throws a shadow 6 in. long, how tall is a tree which throws a shadow 20 ft. long (240 in.)? By simple proportion—

6 : 240 :: 12 : 480, or 40 ft.

This example obviously requires no calculation, as both stick and tree throw a shadow equal to half their height.

## NATIVE ANIMALS ABSOLUTELY PROTECTED.

Tree Kangaroo (all species of Dendrolagus).
Wombat, Duck Mole or Platypus, Hedgehog, or Echidna.
Flying Squirrel or Opossum Mouse.

## A CLOSE SEASON FOR NATIVE BEARS AND OPOSSUMS.

It has been notified, in the *Government Gazette*, 5th November, 1915, that Native Bears and Opossums are totally protected throughout Queensland from the 1st November in each year to the 30th April in the following year, inclusive.

Those interested in the fur trade, trappers, dealers in skins, and young people who take their holidays in the bush, who are fond of "mooning" 'possums and bears and flying squirrels, will do well to note that severe penalties attach to the breaking of the law in this respect. The penalty for killing these animals during the abovementioned close season is up to £5. Cyanide of potassium and other poisons lately used for killing fur-bearing animals are expressly unlawful, and anyone making use of such substance is liable to a fine of £10. By a clause in the Act, however, when Opossums are found to injure any field or garden crops, it is lawful to destroy them. Aboriginals may also kill any marsupials or native bears for food, but it is unlawful to sell or buy any skins thus procured.

## ERADICATING COUCH GRASS FROM A HEDGE.

When couch grass has been allowed to make a heavy growth on land unoccupied by crops, it can be got rid of by repeated working; but where it encroaches, as often happens, beneath a Duranta or Privet hedge, it is more difficult to deal with it. The "Nor'-West Farmer," Manitoba, gives the following advice in the latter case to a correspondent:—

"There are two methods that occur to us as being likely to be practical. One is to take two strips of tar paper. Lay one down lengthwise, like a carpet, alongside the row of shrubs. Lay the other strip down the other side. Cut in from the sides at points opposite the shrubs, so as to push one piece well over the other, and so cover every inch of ground down the row, except just where the shrubs come through. This will seal the ground below the paper. Then throw an inch or so of soil

over the paper, so as to hold it down tightly in place. By sealing up the area absolutely, the couch grass beneath will be smothered out in one season, or, at the most, in two. It may be necessary to use four strips in order to get a wide enough area. If the hedge plants are small, they may suffer somewhat for lack of rain about the roots, but one could easily see if any harm was resulting.

"The other method is to spread a heavy mulch of strawy manure about the rows. This could be done at any time of year. Spread the mulch widely enough. This will not be especially good treatment for the caraganas, but the effect of it on the couch grass will be to cause it to develop its system of root-stocks right up at the surface of the ground. The next year one can select a hot dry time in July to remove the mulch. Then fork up, carry off, and burn the spreading root-stocks. We have known of this plan being tried in the West with reputed success. One must remember, however, that couch grass root-stocks are full of buds, and that even an inch of the root-stocks will produce a new plant. The extermination, therefore, must be thorough, and any bit of root escaping must be dug out when it grows later on.

"We should prefer to try the tar paper method first."

# Answers to Correspondents.

### GAS LIME.

"E.B.," Palmwoods—

Gas lime may be used like ordinary air-slaked lime, broadcasted at the rate of 1 ton per acre. It is very rare that this lime contains any injurious substance. You will find full information about the value and use of lime in the issue of this Journal for May, 1914.

### DROMOTHERAPY—YEOMAN.

"IGNORAMUS," Enoggera—

Dromotherapy is a term derived from the Greek word *dromas*, running. Hence Hippodrome. It is the term for a kind of running adopted in military drill—the science of running. From this root also the camel known as the Dromedary derives its name, as being a swifter animal than the Bactrian camel, which has two humps on its back, the Dromedary having only one. The word "Yeoman" has no reference to a farmer, as many suppose. In the time when England was celebrated for its archery, the Yew-tree was very much in requisition, as all the bows used at the battles of Crecy, Poictiers, Flodden, and Agincourt were made of this wood. Those who bore the bow in battle were called "Yew-men," whence was derived the term "Yeomen." Doing "yeoman service" implied service on the battlefield, not on the farm.

# The Markets.

## PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR NOVEMBER, 1915.

| Article. | | NOVEMBER. |
|---|---|---|
| | | Prices. |
| Bacon | lb. | 1s. 2d. to 1s. 4½d. |
| Bran | ton | £4 15s. |
| Broom Millet | „ | £37 |
| Butter | cwt. | 140s. |
| Chaff, Mixed | ton | £8 to £10 |
| Chaff, Oaten | „ | £10 to £12 |
| Chaff, Lucerne | „ | £13 to £14 |
| Chaff, Wheaten | „ | £8 10s. to £9 10s. |
| Cheese | lb. | 11d. |
| Flour | ton | ... |
| Hams | lb. | 1s. 3½d. |
| Hay, Oaten (Victoria) | ton | £16 |
| Hay, Lucerne | „ | £8 to £9 |
| Honey | lb. | 3d. to 4½d. |
| Maize | bush. | 5s. 9d. to 5s. 10d. |
| Oats | „ | 3s. to 4s. 9d. |
| Onions | ton | £7 10s. to £8 |
| Peanuts | lb. | 3d. to 4d. |
| Pollard | ton | £6 10s. |
| Potatoes | „ | £20 |
| Potatoes (Sweet) | cwt. | 3s. to 4s. |
| Pumpkins | ton | £10 |
| Eggs | doz. | 1s. to 1s. 2d. |
| Fowls | pair | 4s. to 7s. 6d. |
| Ducks, English | „ | 3s. 9d. to 5s. |
| Ducks, Muscovy | „ | 5s. to 6s. 9d. |
| Geese | „ | 3s. 6d. to 5s. |
| Turkeys (Hens) | „ | 9s. to 11s. |
| Turkeys (Gobblers) | „ | 17s. to 22s. |
| Wheat (Chick) | bush. | 5s. 9d. to 6s. |
| **VEGETABLES.** | | |
| Cabbages, per dozen | | 2s. 6d. to 7s. 6d. |
| Cauliflowers, per dozen | | ... |
| Beans, per sugar bag | | 2s. to 7s. 6d. |
| Beetroot, per dozen bunches | | 9d. to 1s. |
| Carrots, per dozen bunches | | 9d. to 1s. |
| Chocos, per quarter-case | | 2s. 6d. to 3s. 9d. |
| Cucumbers, per dozen | | 3d. to 1s. 2d. |
| Custard Marrows, per dozen | | 2s. to 4s. |
| Vegetable Marrows, per dozen | | 2s. to 4s. 6d. |
| Parsnips, per dozen bunches | | ... |
| Lettuce, per dozen | | ... |
| Peas, per sugar bag | | 2s. 6d. to 10s. |
| Celery, per dozen bunches | | 1s. 6d. to 2s. 6d. |
| Sweet Potatoes, per cwt. | | 3s. to 4s. |
| Table Pumpkins, per cwt. | | 6s. to 8s. |
| Tomatoes, per quarter-case | | 2s. 6d. to 8s. 6d. |
| Turnips, per dozen bunches | | 8d. to 9d. |
| Rhubarb, per bundle | | 1s. to 1s. 6d. |

## SOUTHERN FRUIT MARKETS.

| Article. | OCTOBER. Prices. |
|---|---|
| Bananas (Queensland), per case | 13s. to 15s. |
| Bananas (Fiji), per case | 22s. |
| Bananas (G.M.), per case | 20s. |
| Bananas (G.M.), per bunch | 6s. 6d. |
| Mandarins, per case | 15s. to 20s. |
| Mangoes, per case | 6s. to 8s. |
| Oranges (Navel), per case | 17s. to 20s. |
| Oranges (other), per case | 7s. to 12s. |
| Passion Fruit, per half-bushel case | 3s. to 12s. |
| Lemons, per bushel case | 9s. to 12s. |
| Papaw Apples, per double-case | 6s. to 7s. |
| Pineapples (Queens), per case | 12s. to 15s. |
| Pineapples (Ripleys), per double-case | 9s. to 11s. |
| Pineapples (Common), per case | 7s. to 8s. |
| Strawberries (Queensland) per tray | 4s. 6d. to 10s. |
| Tomatoes, per quarter-case | 7s. to 10s. |
| Cucumbers, per case | 20s. |

## PRICES OF FRUIT—TURBOT STREET MARKETS.

| Article. | OCTOBER. Prices. |
|---|---|
| Apples (Tasmanian), per case | 14s. to 22s. |
| Apples, Cooking, per case | 12s. to 15s. |
| Apricots, per case | 5s. 6d. to 10s. 4d. |
| Bananas (Cavendish), per dozen | 2d. to 4½d. |
| Bananas (Sugar), per dozen | 2d. to 4d. |
| Cape Gooseberries, per quarter-case | 7s. to 10s. |
| Cherries, per case | 5s. to 10s. |
| Cocoanuts, per sack | 12s. to 15s. |
| Custard Apples, per quarter-case | 5s. to 8s. |
| Granadillas, per quarter-case | ... |
| Lemons (Lisbon), per case | 5s. to 8s. |
| Loquats (Mammoth), half-bushel case | 5s. to 11s. |
| Limes (Choice), per case | 7s. to 8s. |
| Mandarins, per half-case | 3s. 6d. to 5s. 6d. |
| Mangoes, per case | 5s. to 7s. |
| Oranges (Navel), per case | 8s. to 12s. |
| Oranges (other), per case | 8s. to 12s. |
| Papaw Apples per quarter-case | 2s. to 4s. 8d. |
| Passion Fruit, per quarter-case | 5s. to 8s. |
| Peaches, per case | 1s. 6d. to 3s. 6d. |
| Peanuts, per pound | 3d. to 4d. |
| Rosellas, per sugar bag | ... |
| Pineapples (Ripley), per dozen | 5s. to 9s. |
| Pineapples (Rough), per dozen | 5s. to 6s. |
| Pineapples (Smooth), per dozen | 8s. to 16s. |
| Rockmelons, per case | 3s. to 12s. |
| Strawberries, per dozen pint boxes | 5s. to 12s. |
| Strawberries, per tray | 4s. 6d. to 10s. 6d. |
| Tomatoes, per quarter-case | 2s. 6d. to 8s. 6d. |
| Watermelons, per dozen | 7s. to 12s. |

## TOP PRICES, ENOGGERA YARDS, OCTOBER, 1915.

| Animal. | OCTOBER. Prices. |
|---|---|
| Bullocks ... ... ... ... ... ... ... ... | £20 5s. to £28 2s. 6d. |
| Cows ... ... ... ... ... ... ... ... | £15 5s. to £17 7s. 6d. |
| Merino Wethers ... ... ... ... ... ... ... | 32s. 6d. |
| Crossbred Wethers ... ... ... ... ... ... | 32s. |
| Merino Ewes ... ... ... ... ... ... ... | 28s. |
| Crossbred Ewes ... ... ... ... ... ... ... | 35s. 6d. |
| Lambs ... ... ... ... ... ... ... ... | 36s. |
| Pigs (Porkers) ... ... ... ... ... ... ... | 45s. |

Messrs. Clark Bros., stock and station agents, Bundaberg, inform us that early in November prices ruled high for pigs. One barrow pig, bred and fattened on Tantitha Station, was sold for £8 7s. 8d., and two barrows, fattened on Wombah Station, fetched £7 11s. and £7 1s., respectively. These were record prices for the district.

## LONDON QUOTATIONS.

Cotton (Uplands), 6·89d.; S.I. cotton, 18d. to 30d. per lb.

Jute, £25 10s. per ton.

Sisal hemp, £35 10s. per ton.

Rubber: Fine hard Pará, 3s. per lb.; plantation, first latex crêpe, 3s. 1½d.; smoked sheet, 3s. 0¼d.

Copra (S.S.), £28 2s. 6d. per ton.

# TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

(From which those at places west of Brisbane can be reckoned.)

COMPUTED BY D. EGLINTON, F.R.A.S.

| Date. | SEPTEMBER. | | OCTOBER. | | NOVEMBER. | | DECEMBER. | |
|---|---|---|---|---|---|---|---|---|
| | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. | Rises. | Sets. |
| 1 | 6·4 | 5·33 | 5·30 | 5·47 | 4·59 | 6·4 | 4·46 | 6·27 |
| 2 | 6·3 | 5·33 | 5·29 | 5·48 | 4·58 | 6·4 | 4·46 | 6·28 |
| 3 | 6·2 | 5·34 | 5·28 | 5·48 | 4·58 | 6·5 | 4·46 | 6·28 |
| 4 | 6·1 | 5·34 | 5·27 | 5·49 | 4·57 | 6·6 | 4·46 | 6·29 |
| 5 | 6·0 | 5·35 | 5·26 | 5·49 | 4·57 | 6·6 | 4·46 | 6·29 |
| 6 | 5·59 | 5·35 | 5·25 | 5·50 | 4·56 | 6·7 | 4·46 | 6·30 |
| 7 | 5·58 | 5·36 | 5·24 | 5·50 | 4·55 | 6·8 | 4·46 | 6·30 |
| 8 | 5·57 | 5·36 | 5·23 | 5·51 | 4·54 | 6·9 | 4·47 | 6·31 |
| 9 | 5·56 | 5·37 | 5·22 | 5·51 | 4·53 | 6·10 | 4·47 | 6·32 |
| 10 | 5·55 | 5·37 | 5·21 | 5·52 | 4·53 | 6·11 | 4·47 | 6·33 |
| 11 | 5·53 | 5·38 | 5·20 | 5·52 | 4·52 | 6·11 | 4·47 | 6·34 |
| 12 | 5·52 | 5·38 | 5·19 | 5·53 | 4·51 | 6·12 | 4·47 | 6·35 |
| 13 | 5·50 | 5·38 | 5·18 | 5·53 | 4·51 | 6·12 | 4·48 | 6·36 |
| 14 | 5·49 | 5·39 | 5·17 | 5·54 | 4·50 | 6·13 | 4·48 | 6·36 |
| 15 | 5·48 | 5·39 | 5·16 | 5·54 | 4·50 | 6·14 | 4·48 | 6·37 |
| 16 | 5·46 | 5·40 | 5·15 | 5·55 | 4·49 | 6·15 | 4·49 | 6·38 |
| 17 | 5·45 | 5·40 | 5·14 | 5·55 | 4·49 | 6·16 | 4·49 | 6·38 |
| 18 | 5·44 | 5·41 | 5·13 | 5·56 | 4·48 | 6·16 | 4·50 | 6·39 |
| 19 | 5·43 | 5·41 | 5·12 | 5·56 | 4·48 | 6·17 | 4·50 | 6·39 |
| 20 | 5·42 | 5·42 | 5·11 | 5·57 | 4·48 | 6·18 | 4·51 | 6·40 |
| 21 | 5·41 | 5·42 | 5·10 | 5·57 | 4·48 | 6·19 | 4·51 | 6·40 |
| 22 | 5·40 | 5·43 | 5·9 | 5·58 | 4·47 | 6·20 | 4·52 | 6·41 |
| 23 | 5·39 | 5·43 | 5·8 | 5·58 | 4·47 | 6·21 | 4·52 | 6·41 |
| 24 | 5·37 | 5·44 | 5·7 | 5·59 | 4·47 | 6·21 | 4·53 | 6·41 |
| 25 | 5·36 | 5·44 | 5·6 | 5·59 | 4·47 | 6·22 | 4·53 | 6·42 |
| 26 | 5·35 | 5·45 | 5·5 | 6·0 | 4·47 | 6·23 | 4·54 | 6·42 |
| 27 | 5·33 | 5·45 | 5·4 | 6·0 | 4·47 | 6·24 | 4·54 | 6·42 |
| 28 | 5·32 | 5·46 | 5·3 | 6·1 | 4·47 | 6·25 | 4·55 | 6·43 |
| 29 | 5·31 | 5·46 | 5·2 | 6·1 | 4·47 | 6·26 | 4·55 | 6·43 |
| 30 | 5·30 | 5·47 | 5·1 | 6·2 | 4·47 | 6·27 | 4·56 | 6·44 |
| 31 | ... | ... | 5·0 | 6·3 | ... | ... | 4·56 | 6·44 |

## PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

| | | | H. | M. | |
|---|---|---|---|---|---|
| 2 Sept. | ☽ | Last Quarter | 12 | 56 | a.m. |
| 9 „ | ● | New Moon | 8 | 52 | p.m. |
| 16 „ | ☾ | First Quarter | 5 | 21 | „ |
| 23 „ | ○ | Full Moon | 7 | 35 | „ |

The moon will be at its least distance from the earth, roughly about 226,000 miles, on 14th September; and at its greatest distance, about 252,000 miles, on 2nd and 30th September.

| | | | | | |
|---|---|---|---|---|---|
| 1 Oct. | ☽ | Last Quarter | 7 | 44 | p.m. |
| 9 „ | ● | New Moon | 7 | 42 | a.m. |
| 15 „ | ☾ | First Quarter | 11 | 51 | p.m. |
| 23 „ | ○ | Full Moon | 10 | 15 | a.m. |
| 31 „ | ☽ | Last Quarter | 2 | 39 | p.m. |

The moon will be at its least distance from the earth on 11th October, and at its greatest distance on the 27th.

| | | | | | |
|---|---|---|---|---|---|
| 7 Nov. | ● | New Moon | 5 | 52 | p.m. |
| 14 „ | ☾ | First Quarter | 9 | 3 | a.m. |
| 22 „ | ○ | Full Moon | 3 | 36 | „ |
| 30 „ | ☽ | Last Quarter | 8 | 10 | „ |

The moon will be at its least distance from the earth at midnight on 8th November, and at its greatest distance on the morning of the 24th.

| | | | | | |
|---|---|---|---|---|---|
| 7 Dec. | ● | New Moon | 4 | 3 | a.m. |
| 13 „ | ☾ | First Quarter | 9 | 38 | p.m. |
| 25 „ | ○ | Full Moon | 10 | 52 | „ |
| 29 „ | ☽ | Last Quarter | 10 | 59 | „ |

The moon will be at its least distance from the earth on the morning of 7th December, and at its greatest distance on the morning of the 21st.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 17 m., 28 m., 36 m., and 47 minutes, respectively, later than at Brisbane at this time of the year.

At Roma, on 1st September, the sun will rise about 6·19 and set about 5·51; on 1st October t will rise about 5·46 and set at about 6·4; on 1st November it will rise about 5·18 and set at about 6·20; on 1stDecember it will rise about 5·7 and set at about 6·41.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed by D. Eglinton, F.R.A.S., and should not be reproduced without acknowledgment.]

# Orchard Notes for January.

## THE SOUTHERN COAST DISTRICTS.

The fruit of the month in this part of the State is the grape, and its gathering and marketing will occupy the attention of growers. Care should be taken to cut the fruit when cool and dry, and if it has to be sent any distance the stems of the bunches should be allowed to wilt before the fruit is packed, as the berries will then hang on to the bunch better, and the bunch carry in better order. Select the fruit carefully, grade it, and pack firmly so that it will not bruise in transit. If to be sent long distances, pack in crates holding from four to six 6-lb. baskets. Pines will be ripening in quantity towards the end of the month. Gather before fully coloured, and, whether for Southern or local markets, pack and handle carefully to prevent bruising. Do not ship the fruit too green for the Southern markets, as doing so is apt to spoil the trade. Send good fruit to the canneries. Small pines and crippled fruit are no good to canners, and the sooner our growers realise that it only pays to grow good fruit the better for them and for the canners, as if the latter cannot get good fruit it is impossible for them to put out a line of goods that will not only be a credit to the State, but for which a world-wide market can be obtained.

Passion fruit should not be allowed to lie about for days on the ground before gathering, as if so, they are apt to become fly-infested.

Watermelons and rockmelons are still in season.

Watch any late peaches, Japanese plums, or other fruits liable to be infested with fruit fly, and gather and destroy all infested fruit, or, better still, grub the trees out and burn them, as they only breed flies to destroy more valuable fruit. Mangoes will be ripening during the month. See that all fly-infested fruits are destroyed, as they will only breed up further crops to destroy later ripening fruits.

Citrus orchards can be cyanided during the month for scale insects, and spraying for Maori with the sulphide of soda wash should be continued where necessary.

Mangoes can be budded during the month, as well as citrus and deciduous trees. Tropical fruit trees can be transplanted, taking care to choose dull weather and to cover same from the direct rays of the sun till they have become firmly established. Pines and bananas can still be planted.

## THE TROPICAL COAST DISTRICTS.

See that all bananas are covered with netting, as the fly is usually at its worst at this time of year.

Mangoes will be going off. See that they are not allowed to remain about on the ground to breed flies for the Autumn crop of oranges. Longan, litchi, and other fruit are in season. As the month is often a

very wet one, little cultivation can be done in the orchards. Strong undergrowth should, however, be kept down with a hoe or scythe. Tropical fruits of all sorts can be planted. Look out for Maori on citrus fruits, and spray when necessary.

## THE SOUTHERN AND CENTRAL TABLELANDS.

January is a busy month in the Stanthorpe district; apples, pears, plums, peaches, and nectarines being in season. Do not gather the fruit too immature; at the same time, don't allow it to be over-ripe. Gather dry, handle carefully, and grade and pack in attractive cases. Keep the fruit as cool as possible, and ship in well-ventilated cars. Keep a sharp lookout for fruit fly, and take every possible means to prevent its spreading, even going as far as to gather and destroy the whole of the fruit on any infected trees, as if kept in check during the month the bulk of the fruit ripening during February will be free.

Keep a sharp lookout also for codling moth, examine the bandages on the trees at least every ten days, and destroy all larvæ found therein; also gather and destroy all moth-infected fruit.

Gather Bartlett pears as soon as they are large enough, and store away in a cool shed to ripen; when they show signs of ripening, market—not before. If sent down green, they will sell for cooking and only fetch a small price. The right stage at which to gather is when the fruit is fully developed, and the flesh has lost its woody flavour, but is still quite hard. This is usually before the fly has stung it, and if gathered at this stage the fruit will ripen up properly without shrivelling, and develop its full flavour.

These remarks apply also to the Downs country, which is somewhat earlier than Stanthorpe.

The crop of the month in the Western tablelands is the grape; and the remarks I have made respecting this fruit when grown in the Southern Coast districts apply equally here. The fruit should be gathered dry, and wilted before it is packed. Too large cases are often used; cases holding from 20 to 30 lb., or crates holding six 6-lb. baskets, are preferable, the latter being the best package for shipping the fruit long distances. Keep the orchards well cultivated, and, where water for irrigation is available, give citrus trees a watering during the month, unless there has been a sufficient rainfall. When the orchard is irrigated, see that thorough cultivation follows the irrigation, so as to conserve the moisture in the soil.

Red Scale, which is prevalent on citrus trees in the dry Western country, should be treated during the month. Cyaniding is the best remedy.

# Farm and Garden Notes for January.

Field.—The main business of the field during this month will be ploughing and preparing the land for the potato and other future crops, and keeping all growing crops clean. Great care must be exercised in the selection of seed potatoes to ensure their not being affected by the Irish Blight. Never allow weeds to seed. This may be unavoidable in the event of long-continued heavy rains, but every effort should be made to prevent the weeds coming to maturity. A little maize may still be sown for a late crop. Sow sorghum, imphee, Cape barley, vetches, panicum, teosinte, rye, and cowpeas. In some very early localities potatoes may be sown, but there is considerable risk in sowing during this month, and it may be looked upon merely as an experiment. Plant potatoes whole.

Kitchen Garden.—A first sowing of cabbages, cauliflower, and Brussels sprouts may now be made in a covered seed bed, which must be well watered and carefully protected from insect pests. Sow in narrow shallow drills; they will thus grow more sturdy, and will be easier to transplant than if they were sown broadcast. The main points to be attended to in this early sowing are shading and watering. Give the beds a good soaking every evening. Mulching and a slight dressing of salt will be found of great benefit. Mulch may consist of stable litter, straw, grass, or dead leaves. Dig over all unoccupied land, and turn under all green refuse, as this forms a valuable manure. Turn over the heavy land, breaking the lumps roughly to improve the texture of the soil by exposure to the sun, wind, and rain. In favourable weather, sow French beans, cress, cauliflowers, mustard, cabbage, celery, radish, for Autumn and Winter use. Sow celery in shallow, well-drained boxes or in small beds, which must be shaded till the plants are well up. Parsley may be sown in the same manner. Turnips, carrots, peas, and endive may also be sown, as well as a few cucumber and melon seeds for a late crop. The latter are, however, unlikely to succeed, except in very favourable situations. Transplant any cabbages or cauliflowers which may be ready. We do not, however, advise such early planting of these vegetables, because the fly is most troublesome in February. For preference, we should defer sowing until March. Still, as "the early bird catches the early worm," it is advisable to try and be first in the field with all vegetables, as prices then rule high. Cucumbers, melons, and marrows will be in full bearing, and all fruit as it ripens should be gathered, whether wanted or not, as the productiveness of the vines is decreased by the ripe fruit being left on them. Gather herbs for drying; also garlic, onions, and eschalots as the tops die down.

FLOWER GARDEN.—To make the flower beds gay and attractive during the Autumn and Winter months is not a matter of great difficulty. Prepare a few shallow boxes. Make a compost, a great part of which should consist of rotten leaves. Fill the boxes with the compost, then sow thinly the seeds of annuals. Keep the surface of the soil moist, and when the young seedlings are large enough to handle life them gentle one by one with a knife or a zinc label—*never pull them up by hand,* as, by so doing, the tender rootlets are broken, and little soil will adhere to the roots. Then prick them out into beds or boxes of very light soil containing plenty of leaf mould. Then keep a sharp lookout for slugs and caterpillars. Keep a supply of tobacco dust on hand, and scatter this in the path of the slug, and he will cease from troubling you.

All kinds of shrubby plants may be propagated by cuttings. Thus, pelargoniums, crotons, coleus, and many kinds of tropical foliage plants can be obtained from cuttings made this month. After putting out cuttings in a propagating frame, shade them with a piece of calico stretched over it. Be careful not to overwater at this season. Propagate verbenas, not forgetting to include the large scarlet Fox-hunter. Verbenas require rich soil. Palms may be planted out this month. If the weather proves dry, shade all trees planted out. With seed boxes, mulch, shade, water, and kerosene spray, all of which imply a certain amount of morning and evening work; the flower garden in Autumn and Winter will present a charming sight and will afford light and profitable work for girls with spare time on their hands.

An exhaustive booklet on "Flower Gardening for Amateurs" has been issued by the Department of Agriculture and Stock, and may be obtained from the Office. Price, 2s.

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Edited by A. J. BOYD, F.R.G.S.Q.

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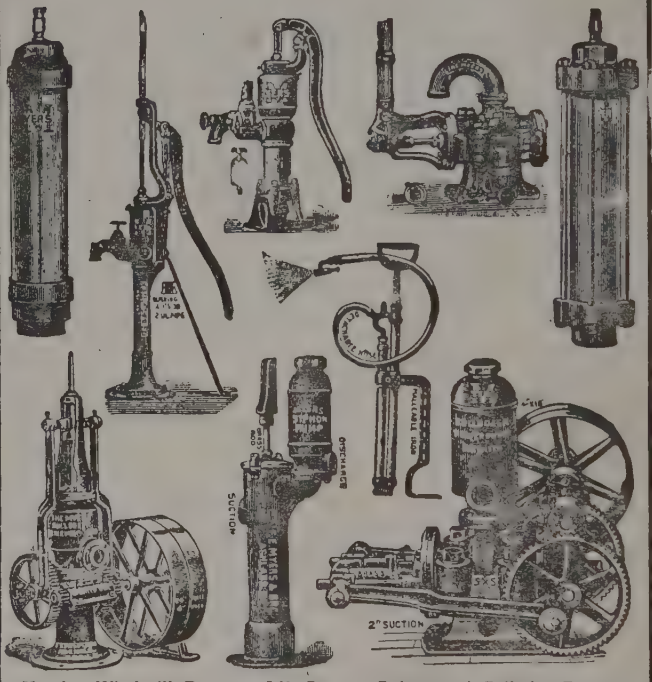


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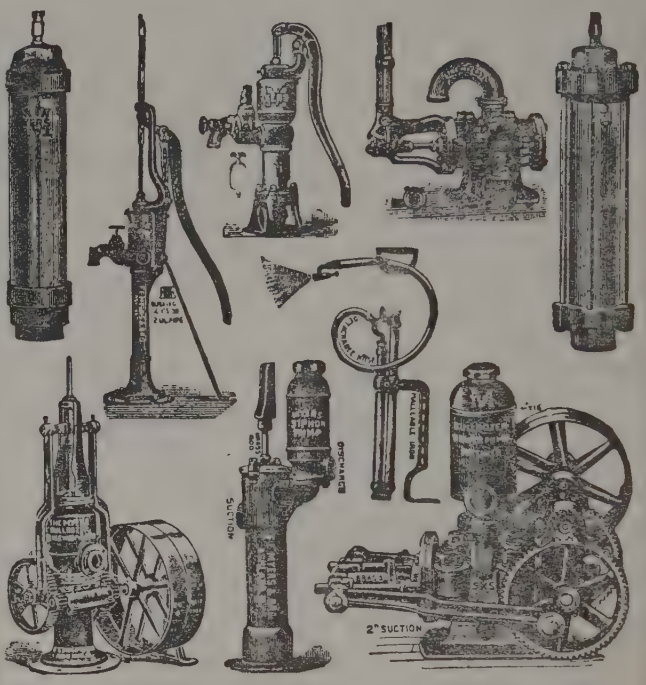


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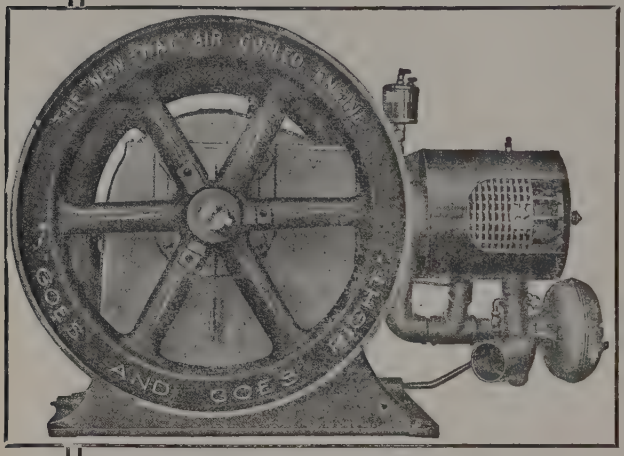


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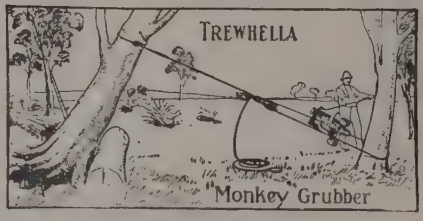


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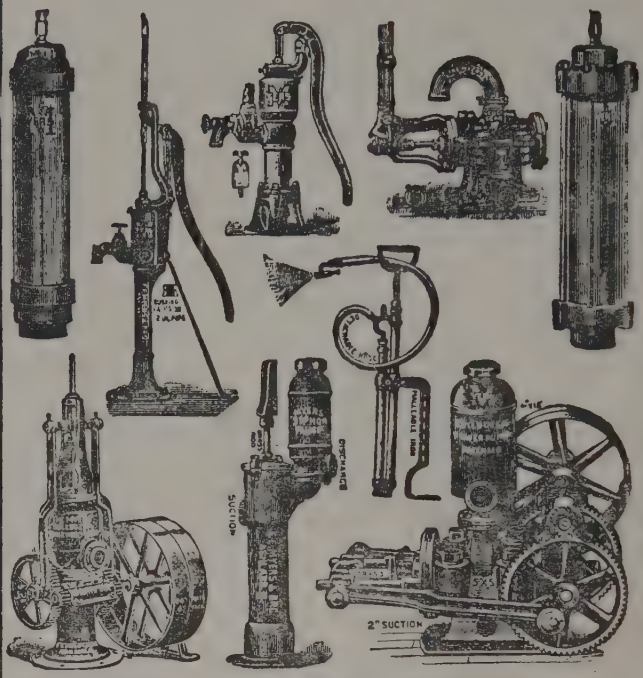
# MYERS PUMPS

HAND, WINDMILL OR POWER



Hand or Windmill, Force or Lift Pumps, Submerged Cylinder Pumps, Pump Stands, Siphon and Tank Pumps, Power Pumps, Working Heads, Pumping Jacks, Cylinders etc. Spray Pumps—Bucket, Barrel or Power

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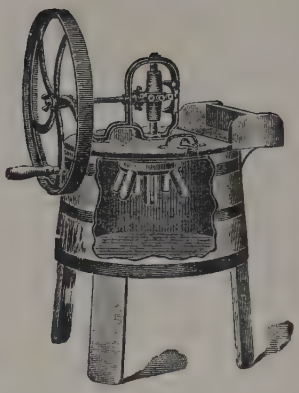
# The O.K. Washing Machine



**The BEST Semi-Rotary. Strongly built and works almost silently on steel revolving ball-bearings.**

AS every person knows, washing day, especially in warm climates like ours, is the housewife's horror. To have to stand over the steaming tubs, rubbing and rubbing all day long, till your back feels as if it would break, and your temper as well, is undoubtedly one of the most trying parts of the good wife's daily duties.

The old adage, "Woman's work is never done," we all know to be only too true. Then why not try to lessen the burden in every possible way according to your means ?

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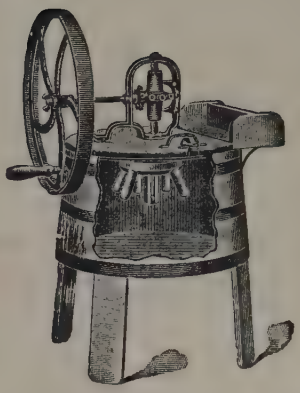
# The O.K. Washing Machine



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